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CONTENTS

EDITORIAL:

Best Form of Semaphore	1193
The Train Auditor—A Subterfuge	1194
Government Supervision of Locomotive Boiler Inspection	1194
Changes in the Pacific Coast Situation	1195
New Publication	1196

ILLUSTRATED:

The Galveston Causeway	1204
Package Car Service from St. Louis	1212
Track Testing Apparatus	1215
Air-Brake Hose Mounting Machine at Brainerd Shops of the Northern Pacific	1216
The Semaphore; Upper Left vs. Upper Right	1219

LETTERS TO THE EDITOR:

Thanks!	1196
Journal Box Standards	1196
Government Supervision and Inspection of Locomotive Boilers	1197

MISCELLANEOUS:

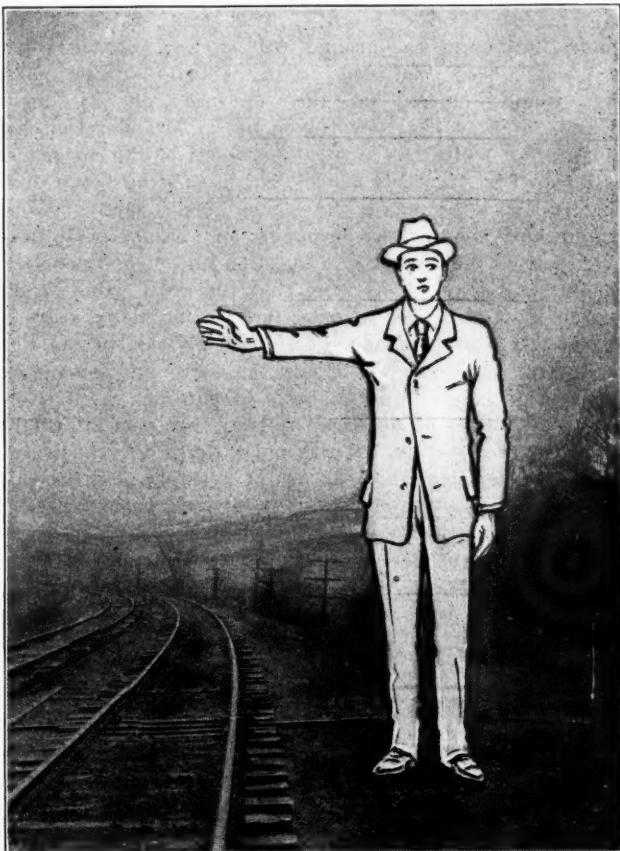
The International Railway General Foremen's Association	1200
A Comparison of Locomotive Building in the United States, Germany and France	1202
Grain Handling in the United States	1209
Railway Rate Making in Practice	1212
Railway Signal Association	1217
Our Engineering Education and the Men It Produces	1218
German Airship Lines. [Note].	1212

GENERAL NEWS SECTION:

General News	1221
Traffic News	1224
Railroad Officers	1228
Railroad Construction	1229
Railroad Financial News	1230
Equipment and Supplies	1231
Supply Trade News	1233

The discussion in the Railway Signal Association in New York this week on Mr. Morrison's proposition to change the arrangement of the arms on semaphore signals, brought out quite clearly that a number of prominent members concede the soundness of his idea but doubt whether it is of enough importance to warrant them in adopting it. They are like the well known citizen of Maine in his attitude toward the venerable prohibitory law of that state: he was in favor of the law but agin its enforcement. These signal engineers believe in correct principles, but the railway officers' constant *bete noire*, the economy knife, prevents carrying them out. In theory Mr. Morrison's position is impregnable. The first position-signal used in railroading was, undoubtedly, a man. This man, standing in the most favorable position to be seen from an approaching engine, would naturally signal with his right arm; not simply because (usually) he is a right-handed man, but because his right is directly in front of the engineman, whereas his left arm, if extended horizontally at right angles to the track, points away from the engine. The arm extended horizontally is the most natural stop signal that can be given by a motionless arm. The old semaphores on the Boston & Albany, the New York & New Haven and the New York Central were therefore the most logical semaphores ever used. As long as the movement of

the arm was downward from the horizontal there was some reason in the objection to this natural arrangement, because the man-semaphore would have to move away from the track in order to let his arm fall clear of the passing cars; and a wooden semaphore could not thus easily avoid getting its arm knocked off. But with the upward inclination this objection is removed, for the man-semaphore must, of course, be about 20 ft. high, and in raising his arm to indicate all-right he clears the cars nicely. This will be seen from the illustration given herewith, which shows a natural man, one who lived



The Earliest Type of Position Signal.*

and flourished before uniform caps and other official restraints had been thought of. Being natural, we may depend upon it that his actions will afford us a trustworthy guide. If he had been one of those artificial men who swing lanterns in the standard code, there is no telling what errors he might have led us into.

Economy, however, is not the only obstacle to the general success of Mr. Morrison's innovation; there was a good deal of talk about the unwisdom of changing standards too often. The ink is hardly dry on the resolution to make "upper right" the standard, and now it is proposed to adopt upper left. But, as was well said, no great question is settled until it is settled right; and signaling practice has a way of improving itself now and then, even if it does not get the permission of any association. Mr. Morrison has made the changes described in his paper in order to meet the new conditions imposed by his two styles of electric railway; and as it is quite possible that a dozen other roads may soon have to deal with similar conditions, he may have a considerable following, without much regard to what this or any other association may decide. While, as we have said, Mr. Morri-

*The very bad joint in the track was put in by the engraver without leave. It is supposed that he could not bear to depict a stop signal without showing some good reason why it was displayed. The very bad spot in the left-hand track will do no harm, as it has broken the track circuit and the automatic signal around the curve is now displayed at "stop."

son's ideals are peculiarly well fortified, his opponents who argue from the standpoint of economy are well fortified, too. His argument in favor of left hand to avoid buildings and rock cuts was met by one, perhaps equally good, in favor of right hand, to meet situations where the post could not readily be set out far from the track, as on bridges. Mr. Morrison had the best of it, however, for with his scheme signals might have arms lower right, upper left, or both (half of the arm on each side) and all be consistent with each other. It is only fair to add, however, that his success is due in considerable measure to his practice of keeping his signal blades always bright. The arm being bright, the most indifferent background will answer. Roads which have long been satisfied with signals dingy with smoke would object to the expense of so much soap and paint as the New Haven uses. Mr. Morrison has tried painting white the vertical members of the suspended signals (see Fig. 12 of his paper), but finds it no better than black. In short, he makes the blades bright partly because he cannot have good sky backgrounds; and, having made them bright, he finds the background question no longer important. Incidentally, it may be observed that the great value of sky backgrounds is disproved also by the use for many years of comparatively short posts on the Hudson division of the New York Central. The question of how the right-hand semaphore, with its shaky basis of logic, came to entrench itself so securely in the hearts of American railway men was informally discussed at the meeting, but was not satisfactorily answered. We venture the guess that the use of a single post for both eastbound and westbound arms—as at many of the early block stations on the Pennsylvania—had a great deal to do with it. Right and left arms would be assigned naturally to right and left tracks. The same arrangement was equally adapted to (and was used on) the left-hand railways of England.

THE TRAIN AUDITOR—A SUBTERFUGE.

The growth of the train auditing experiment within the past year or so has some rather interesting economic and sociologic aspects. The train auditor is employed on passenger trains, not because the conductor is too busy to collect tickets and fares, but because, amid the perplexities of his manifold duties, he does not always find time to turn in to the company all the fares which he collects. This is a direct and simple statement of the situation, untangled by the phraseology of diplomacy. The conductors have not done their work satisfactorily; hence additional men are employed to do it in their place.

It is true in all other businesses that a man who does not do his work satisfactorily will, before long, find somebody else employed to do it. But the extraordinary feature of this conductor situation is that the displaced men still retain their positions and their former pay. This is so different from ordinary commercial practice that it is worthy of discussion.

It is usually customary to bond fiduciary agents in all employments where considerable sums of money are handled by individuals. This is a commonplace with the bank clerk or with the state treasurer, but it is extremely difficult to apply in the work of conductors because of the absence of direct proof of loss. Where a conductor gives a receipt he does not steal the money; but there are ways to "knock down," in spite of the rule requiring receipts, and a dishonest conductor finds them. The only way that the superintendent can check petty pilfering of cash receipts is to send around a spotter, who rides on the trains, pays cash fares, and reports where he has ridden and what he has paid. If the general office fails to receive the vouchers for these payments there is the chance that the spotter and not the conductor has been the dishonest party. Proof is impossible.

Yet the fact is noteworthy that certain roads have found

that they could increase their cash receipts as much as 25 per cent. by employing train auditors. Some roads that have tried this expedient temporarily have found that the aggregate of cash fares gradually fell off again after they discontinued the auditors' services.

The pay of passenger conductors averages around \$150 a month, flat. Train auditors are generally paid \$100 a month, plus \$1 a day expenses. The conductor is presumptively a higher class man than the auditor, and hence less open to suspicion; but when the train auditor is suspected he can be discharged without formality. Unfortunately, the superintendent has no such power in the case of the conductor. The conductor belongs to a strong union, and must not be discharged without cause. Yet, as has been said, the specific proof of dishonesty which the brotherhood asks for is almost always impossible to obtain. Hence the curious anomaly has arisen of the employment of a lower grade man to do the fiscal part of the conductor's work, simply because he can be discharged on suspicion, whereas the conductor cannot be discharged. In spite of the fact that train crew wages are materially increased thereby, the saving has a good deal more than paid the train auditor's wages on the roads that have tried the experiment.

This situation is a very discreditable one. It is bad discipline and bad morals for a railway to continue in service a body of men which, as a body, it cannot trust. Moreover, this procedure casts a stigma on the large majority of conductors in the service—able, honorable men whose honesty is unquestioned. It looks as if the conductors' brotherhood ought to be considerably more interested in this situation than any other party to it. The brotherhood is not intentionally taking the position of shielding dishonesty, but this is what it comes to, and it is a very bad position to be in. The brotherhood has made it so difficult for an unfit man—even when he is conspicuously unfit—to be discharged on suspicion, that all of its members who run passenger trains, no matter how scrupulously honest, have to be classed as black sheep, and have to be denied the responsibility of handling company's funds! Can there be any possible doubt that it is to the interest of the conductors' brotherhood to find some way of removing this stigma?

GOVERNMENT SUPERVISION OF LOCOMOTIVE BOILER INSPECTION.

A correspondent discusses at length in this issue Bill No. 236, which is pending in the United States Senate, and which provides for government supervision and inspection of locomotive boilers. It is unfortunate that in the preparation of an Act intended to insure the safety of the public and in which the railways are so largely concerned, the mechanical officers of railways have not been called into consultation so that at least an intelligent view of the requirements could be obtained. As our correspondent clearly shows, most of the provisions and requirements of the bill are unpractical, unnecessary, and would be in their operation unduly expensive, both for the government and for the railways.

A good example of better practice in such legislation is seen in the railway law of the state of New York in regard to the inspection of locomotive boilers which went into effect September 1, 1907. The general direction of this inspection is placed with the public service commissioners, who formulate the rules governing the work and appoint a state inspector of locomotive boilers, who has direct supervision of the work throughout the state. Fortunately, the details relating to the rules for inspection were intrusted to one of the commissioners, who is an educated locomotive designer, and was a railway motive power officer. He was wise and fair enough to call into consultation two motive power officers of the principal roads in the state, and while these officers are not exactly satisfied with the inspection rules which became

a part of the law, yet they are the result of a compromise between competent and intelligent authorities, and are not subject to the same severe criticisms as the bill pending in Congress. We may, therefore, compare with some profit these rules with the provisions of Senate bill No. 236, and we will refer to the former as the "New York rules" and the latter as the "proposed Senate rules."

The proposed Senate rules require a hydrostatic test of 50 per cent. above maximum working pressure, while the New York rules require this test to be made at 25 per cent. above the working pressure, and the large experience of the railways has shown the latter to be ample. The Senate bill requires this hydrostatic test and other inspection to be made four times a year, while the New York law requires them to be made only once a year. The yearly inspection is now the general practice with railways, and the United States Government itself considers this interval between tests of marine boilers as not too great.

There is one point in which we differ from our correspondent, and that is the question of the necessity of the water glass. He argues at length against the requirement of this fixture and we are pleased to give his remarks as a good presentation of that side of the question. We are inclined to think, however, that the railways could well afford to concede this requirement as a compromise when there is no fully established practice relating to it. Many of the roads use the water glass and regard it as a necessity. It is true that the ordinary water glass is a dangerous fixture, but the improved ones made of flat, ribbed glass are seldom broken, and they must be a great convenience to the enginemen. When gage cocks only are used there is no indication of the water level unless they are operated by hand. When the engineer is busy looking for signals and watching the gages, and his hands are required for the operation of the reverse lever, the air brake and the throttle, it is a great help to have a visual indicator of the level of the water in the boiler and not be required to be constantly trying the gage cocks. When it is inconvenient to do this and the attention is occupied by other things, it is possible to neglect the gage cocks too long. The firemen too is busy shoveling coal or regulating the injector, and he does not want to be constantly testing the gage cocks. The modern water glass is of material assistance to the enginemen and the objection to its fluctuation when the water is foaming applies equally well to the gage cock. As a convenient assistance to the engineer it is worth what it costs, and its compulsory application cannot be regarded as a hardship. In such details the railways do not strengthen their cause by labored opposition, and they will be likely to gain more by conceding reasonable requirements and applying the strength of their opposition to those provisions in the bill which are manifestly absurd, unpractical and useless, than by opposing any legislation whatever.

The various provisions of the Senate bill which relate to "the dimensions for the passage of water and steam," "the space between and around the tubes," "pipes and tubes exposed to heat to be of proper dimensions and free from obstructions," are vague, indefinite and unwise. They are not necessary and offer invitation and opportunity for an unscrupulous inspector easily to work a hardship on the railway, or grant it immunity from such hardship for his own gain. The same is true of those provisions of the bill which relate to the design and construction and strength of materials. As our correspondent points out, the men who will be appointed inspectors may be competent to make an ordinary test and inspection of a locomotive boiler, but are not likely to be competent to decide questions as to the design of the boiler and the strength of its materials. Such provisions are not necessary, as it is to the interest of the railways to see that these matters are properly supervised by competent engineers, and the public safety is seldom, if ever, jeopardized by neglect in this particular.

CHANGES IN THE PACIFIC COAST SITUATION.

Two important announcements affecting the transportation system of the Pacific coast have been made within the past thirty days. Reference has already been made in our news columns to the opening of the Portland gateway through an agreement which will permit the Harriman interests to make through routings across the Columbia river bridge and over the Northern Pacific line between Vancouver and South Tacoma, Wash. This arrangement, of course, will necessitate double tracking this very busy piece of road, which has always been an important earner for the Northern Pacific. But, apart from this immediate physical effect, it will have the very important strategic result of wiping out the barrier to the north extension of the Harriman lines on the coast. Heretofore they have had their empire—and a very great one—south of the Columbia river, but Seattle is clearly marked for the great port of the Northwest, and the Harriman lines had no entry into Seattle nor into the whole Puget Sound region, with harbors nearer the Orient than any other accessible harbors in the country; with great timber resources, and with the base for the Alaska trade. The magnificent extension built jointly by the Northern Pacific and the Great Northern along the north bank of the Columbia river from Pasco to Portland clinched the argument; the Harriman lines felt their need of a share in the traffic of this country and were prepared to spend great sums to obtain it, by competitive building from some point on the Columbia to Tacoma. The Hill interests wisely figured that they would gain nothing by a fight to the end with such a conclusion clearly indicated, so they compromised by allowing joint use of their existing route from Portland north into the Puget Sound empire.

The other important news, announced this week, is the traffic agreement between the Chicago & Alton and the Kansas City, Mexico & Orient. The Kansas City, Mexico & Orient is building a long diagonal from Kansas City, across Kansas, Oklahoma, Texas and several Mexican states to Topolobampo, at the mouth of the gulf of California. It has actually built and is now operating something more than half of the 1,659 miles projected, and it has received from the Mexican government important subsidies and guarantees of immunity from competition. There is still some extremely difficult work to be done on the Mountain division of the road, between Sanchez, near the border line of the states of Chihuahua and Sinaloa, and Fuerte, 62 miles from the Pacific coast terminus. The distance between these points as projected is approximately 200 miles, and the difference between them in elevation is 7,700 ft., Sanchez being the high point in the Mountain division.

At best, this route will be subject to severe mountain grades, but it is not apparent that they will be materially worse than those with which the Canadian Pacific, Great Northern and Northern Pacific are now confronted. The distance from Chicago to Kansas City on the Alton is 483 miles. Add this to the 1,659 miles of the Kansas City, Mexico & Orient, and the total distance from Chicago to the coast figures at 2,142 miles. The distance from Omaha to San Francisco on the Union Pacific is 1,786 miles, and from Chicago to San Francisco by the same route and the Chicago & North Western, is 2,276 miles. Taking distances from Kansas City, the Kansas City, Mexico & Orient, with 1,659 miles to Topolobampo, compares with the Santa Fe, with 2,576 miles between Kansas City and San Francisco. In view of the fact that Topolobampo has an excellent harbor for deep-sea vessels, and that ocean freights on bulky goods are very low, it appears wholly likely that this route can be made to figure largely in the Pacific coast traffic situation. The Tehuantepec route is already an important factor, and for the transportation of bulky goods which have some urgency, as, for example, building materials, it has become widely used. One prominent builder on the Pacific coast recently stated that he was now

routing all his shipments that way, and the company is showing rapid increases in business.

It is understood that the Hamburg-American Packet Company will supply the steamer service on the coast to connect with the Topolobampo route, and the effect on the traffic situation of the coast will be awaited with great interest. There is little likelihood that the unfinished portions of the line can be put into operation within the next twelve months, but there is now every indication that they will be completed sooner or later, and the new traffic contract gives the Kansas City, Mexico & Orient a firm base and the Hawley system a long arm.

NEW PUBLICATIONS.

Seaboard Air Line.—Extracts from *The Evening Mail*. Distributed by Townsend, Scott & Son, Bankers, Baltimore, Md. 11 pages; 6 x 9 in.; paper.

This analysis of the Seaboard Air Line was written by Charles F. Speare, Financial Editor of the New York Evening Mail, and shows rather more clearly than any other discussion on the subject which we have seen, the present financial and traffic position of the Seaboard Air Line.

The Electric Power Station. By Calvin F. Swingle, M.E., 1909, Chicago. Frederick G. A. Drake & Co. 718 pages; 5 1/4 in. x 7 1/2 in. Price, \$2.00.

The equipment of the central power station, its boilers, steam engines, gas engines and dynamos is here described in a clear and elementary manner. The author deals mainly with the operation of these machines and their auxiliary equipment rather than their construction and erection, although the design and construction receives some attention.

The book is intended for the engineers and firemen connected with power stations and is well adapted to its purposes. After each chapter follows a series of questions and answers which serve to clear up and summarize the various subjects there treated. The treatment is unusually full and complete and the book is one of the best of the kind which has been published. The illustrations are numerous and appropriate. Considering the amount of material furnished the price must be considered moderate.

Morrison's Spring Tables. By Egbert R. Morrison. Sharon, Pa.: Morrison J. Martin. 84 pages; 6 in. x 9 in.; illustrated; cloth. Price, \$1.

As its name indicates this book is formed of a series of tables of spring calculations, in which the size of the wire, the inside and outside diameters, length of wire per inch, free height per inch of solid height and capacity are given. It is suggested that the value of the tables would have been greatly increased if a direct reading of deflection per unit of weight had been given instead of placing such a determination dependent upon calculation.

In the opening pages there are given the series of formulas upon which the calculations are based, and these are stated both in general and specific terms. That is to say, the general formulas are applicable to any material, the proper constants having been supplied, while the specific refer to steel with the constants given. In this the calculations are based upon a fiber stress of 80,000 lbs. per sq. in. and with a modulus of elasticity of 12,600,000 for helical and 25,400,000 for elliptical springs. In the working out of the tables the springs have been grouped in two classes, the heavy and light. The light spring has been considered to be one whose bar, if a helical, is less than $\frac{1}{8}$ in. in diameter, or whose plate is less than $\frac{1}{8}$ in. thick if an elliptic. Where the corresponding dimensions are greater than this, the spring is considered to be heavy. The book will be of value in making rough and rapid determination of the capacity and weights of springs, though it is not quite clear whether an allowance in the weight has been made for the taper of the bar of helical springs; but, from the context, it is probable that no such allowance has been made.

Letters to the Editor.

THANKS!

San Francisco, Cal., May 25, 1909.

To THE EDITOR OF THE RAILROAD AGE GAZETTE:

Your issue of May 14 contains an editorial on transcontinental freight rates that covers the situation more completely and correctly than any article I have ever seen in public print on the same subject. It is a very complicated question and only those who are up against it continually or that give it some special study are able to understand it.

Please accept my congratulations. I am certain that the article will do considerable good. EDWARD CHAMBERS, Assistant Freight Traffic Manager, A. T. & S. F.

JOURNAL BOX STANDARDS.

Baltimore, Md., June 5, 1909.

To THE EDITOR OF THE RAILROAD AGE GAZETTE:

In the preparation of or in the revision, from time to time, of standards of the M. C. B. Association the various committees could no doubt receive some assistance of value from the manufacturers of those railway specialties which of necessity must conform to the standards as established or revised. This plan does not seem to have been pursued to any extent by the M. C. B. Association, with the result, the writer ventures to suggest, that some standards have been adopted or revised without due consideration of all the service conditions affecting the detail construction of certain parts of freight and passenger equipment.

As the engineer of one of the largest manufacturing establishments in the United States producing M. C. B. journal boxes to-day, the writer has of necessity been a close observer of the changes recommended and adopted from time to time in this detail part of freight and passenger cars, and has noted certain changes which no doubt beneficial from one viewpoint, seem to leave entirely out of consideration other viewpoints.

The particular changes had in mind are the revisions made in 1907 and 1908 in the interior dimensions of journal boxes and width of openings through inside and outside dust guard walls.

The change in interior dimensions was recommended and adopted in order to increase the end clearances between the brass and the journal box and between the wedge and the box, taking into consideration that these parts are rough castings, and as such, subject to considerable departure from nominal dimensions. Granting the force of this reason for increase in end clearances, would not the same thing have been better accomplished by changing the dimensions of the brass and wedge rather than the box? Journal brasses wear out very much faster than journal boxes, and there are many hundreds of thousands M. C. B. journal boxes in service to-day which were made previous to the revisions of 1907 and 1908 and which must receive new brasses, and also wedges, from time to time. As long as replacements of brasses and wedges in such boxes are made, so long will the trouble with lack of proper end clearance continue; whereas, if the nominal dimensions of brass and wedge were changed to take care of unavoidable commercial variation from nominal dimensions, the many thousands of boxes in service are provided for as well as all new boxes which may be made in future.

Taking up the question of the increase in width of openings through dust guard walls, while undoubtedly this has proved a move in the right direction for journal boxes made of gray iron, yet a corresponding increase in the width of the dust guard slot seems to have been entirely overlooked. The obvious reason for the increase in width of openings referred to was to avoid the destructive lateral blow against the dust guard walls delivered by the dust guard seat of the axle due to quick application of brakes, shunting of unloaded cars, etc. As the dust guard must move with the axle, and the allowed

lateral movement of the dust guard is very much restricted by the very slight excess in width of slot over width of dust guard, it is obvious that the blow which the journal box now escapes is delivered directly against the dust guard, putting this wooden part very quickly out of working order.

In manufacturing malleable iron journal boxes for freight service it has been the practice of the Symington Company to adhere to M. C. B. dimensions for width of dust guard slot, but to restrict the allowed lateral movement each way between dust guard seat of axle and dust guard walls of box to from $\frac{1}{4}$ in. to $\frac{1}{8}$ in. A malleable box being amply strong to take any lateral shock which it may receive from the axle, it seems good design to let it take the impact of the axle on the dust guard walls, and in this way protect the dust guard from destruction, this part being necessarily of somewhat weak construction.

If it is the intention to continue indefinitely the consideration of cast iron arch bar truck journal boxes in connection with M. C. B. standard dimensions, the writer shares the opinion of the committee on revision of standards that the width of openings through dust guard walls should remain as at present, but in a cast iron box a further revision should include a sufficient increase in the width of the dust guard slot to allow the dust guard the same amount of extreme lateral movement as the axle. For freight service the journal box of malleable iron is now so generally conceded as desirable and necessary from the standpoint of strength that the question presents itself whether cast iron boxes should not be eliminated altogether from consideration. This being done, the factor of breakage out of the way, the width of opening through the dust guard walls of malleable boxes need be only $\frac{1}{2}$ in. or $\frac{5}{8}$ in. in excess of the diameter of the dust guard seat of axle, thus avoiding the present wide rear opening and the greater opportunity for dust to enter at the back of the box.

A. H. WESTON,
Mechanical Engineer, The T. H. Symington Co.

GOVERNMENT SUPERVISION AND INSPECTION OF LOCOMOTIVE BOILERS.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

On March 22 there was introduced in the United States Senate a bill (No. 236) "to promote the safety of employees and travelers upon railroads by compelling common carriers by railroad to equip their locomotives with safe and suitable boilers and appurtenances thereto." A careful study of this bill shows it to be seriously objectionable, if not actually vicious, in almost every particular, and the railways should use every influence to prevent its adoption. I point out in the following the many bad features of this measure:

Section 1, page 1, lines 10-12 and page 2, lines 1-4:

" * * * the boiler of which is not equipped with a steam-pressure gage, safety valve, gage cocks or try cocks, a water glass showing the height of water in such boiler, and having a shut-off cock, or shut-off valve, at each end of such glass, and all such cocks and valves shall be so constructed and maintained that they can be easily opened and closed by hand; * * *

The road with which I am connected does not use a water glass on locomotive boilers, considering it a source of danger, and our locomotive engineers do not advocate its use. Notwithstanding the fact that many of the men have had experience with it on other lines, they prefer to depend upon the gage cock as a sure means of carrying the water at the proper level. As a matter of fact, the percentage of risk of personal injury from broken water glasses is far greater than from boiler explosions. Recently, on a certain road, one man was killed and another was maimed for life, due to a broken water glass causing them to leap from a moving locomotive. I can personally recall several instances of engineers or firemen having eyes put out by the bursting of a water glass.

The glass is apt to become stopped up with sediment and, when in this condition, it may or may not show water to a height corresponding to the height of water in the boiler. This

failure of the water glass to correctly indicate the height of water in the boiler has been the cause of low water and, thereby, the cause of the burning of a great many locomotive boilers. The water glass is especially deceptive as an indicator of the height of water in the boiler when the water is foaming.

With the gage cock, there is always full pressure of the boiler to dislodge any obstruction in the water passage or at the valve. When the gage cock is inoperative, the engineer is aware of the condition at the first trial, as there is no water or noise upon opening the same; but the water glass is silent and deceives the engineer. If there is any obstruction in the water glass, it does not properly indicate the height of water, but the full boiler pressure on the gage cocks is by all means the surest method of telling the amount of water in the boiler, when the cocks are used. Many men have been scalded and not a few have been painfully hurt, including the loss of an eye, due to the water glass exploding. On the modern locomotive there is very little room between the boiler and the side of the cab, and in case of an explosion the engineman is in a dangerous position. When an explosion occurs there are two passages open, the top valve for steam and the bottom valve for scalding water, and both at full pressure. They must be closed by the engineer and it is done by wearing gloves, covering the exposed parts of his person and heroically facing the ordeal.

It may be claimed that the water glass can be made safe by the use of metal fenders or by the use of flat, thick glasses. Metal fenders obstruct the view, and flat, thick glasses become non-transparent. Automatic stop cocks are on the market, but they are objectionable by reason of forming an additional obstruction to the free passage of the water and making the stopping of the glass the more certain.

The use of a water glass on stationary boilers is a different matter from a locomotive, as a boiler room is not so small, and the men around the boiler can stand farther away from the glass and are not so liable to injury if it explodes.

Section 1, page 2, lines 7-10:

"That such boiler shall withstand a hydrostatic test in the ratio of 150 lbs. to the square inch to 100 lbs. to the square inch of the working steam power allowed."

We apply this hydrostatic test not less than once a year and I understand the other roads do likewise. This is considered good practice by eminent mechanical men. When the hydrostatic test of 10 per cent. above the working steam pressure is considered good practice, why subject a boiler to 50 per cent. in excess of the pressure allowed and possibly weaken it at some point that is likely to result later in a serious accident?

The federal regulations governing steam water craft call for inspection and tests of boilers once a year. Why then should the same inspection and tests of locomotive boilers be required four times each year? We all know that a boiler explosion on a steamboat is a much more serious thing than the explosion of a locomotive boiler.

Section 1, page 2, lines 10-11:

"That such boiler and appurtenances are well made, of good and suitable material."

This prescribes something very indefinite and leaves open to controversy what is good and suitable material and who shall be the judge. The railway may consider that the materials are suitable, and the inspector have an opposite opinion. This bill has prescribed what tests the boiler shall stand and it would naturally follow that the boiler must be of good and suitable material; therefore, it is not necessary to make a provision of this kind, leaving everything so indefinite.

Section 1, page 2, lines 11, 12, 13 and 14:

"That the openings for the passage of water and steam are of the proper dimensions and free from obstructions."

This opens the question as to what is the proper design of a locomotive boiler and also the proper sizes for water passages in the water glass and gage cocks and all the valves on the boiler. The words, "and free from obstructions," would make it a penalty to operate a locomotive with the water-

glass lower passage or a gage cock stopped up. The stopping up is something that could happen at any hour, especially so in the rainy season when muddy water is used. It would also penalize the railways if mud should accumulate in the leg of the firebox or the shell of the boiler, yet this is the only place for mud to accumulate until it is removed by blowing out, or washing the boiler. A railway would always be at the mercy of the inspector as to what amount of mud might accumulate before it would be considered a penalty. Technically any accumulation would be an obstruction.

Section 1, page 2, lines 12, 13 and 14:

"All pipes and tubes exposed to heat are of proper dimensions and free from obstruction."

As the entire boiler and appurtenances are hot, they are, of course, exposed to heat, but it is my opinion that this portion of the proposed bill was intended to apply directly to the flues. This would impose a penalty for operating a locomotive with any of the flues stopped up by cinders at any time. The stopping up of flues by cinders occurs sometimes a few miles from the terminal, and on locomotives such as those switching for a week at a time around a mine, some of the flues are stopped up on the first day's work and remain so, as it is no element of danger. It only lowers the steaming efficiency of the boiler. This part of the bill is so drawn that if an inspector so elects, he can penalize a road for operating a locomotive with an obstruction in certain passages, when these obstructions occur in regular service and it is impracticable to avoid them. This is unfair and drastic. It makes it impracticable for railways to help being lawbreakers.

Section 1, page 2, lines 14 and 15:

"That the space between and around the flues is sufficient."

This is another matter that enters into a design of a boiler. Some boilers have a space between the flues of $\frac{3}{8}$ in., others 1 in. There seems to be no definite rule to follow in determining the spacing between the flues. About $\frac{3}{4}$ in. is present average practice. But this is a matter of boiler efficiency and not of safety. If an inspector decided that $\frac{3}{4}$ in. space between the flues was the minimum for safety, it would condemn the flue sheets in nearly half of the locomotives in the United States.

Section 1, page 2, line 13:

"Tubes exposed to heat are of proper dimensions."

This is so worded that the inspector, if he so desired, could condemn almost any boiler flues.

Section 1, page 2, lines 15 to 23:

"That the boiler, flues, safety valves, fusible plugs, low-water indicators, feed-water apparatus, gage cocks, steam gage, water and steam pipes, low-water gages, means of moving mud and sediment from boiler, and all other machinery and appurtenances thereof are of such construction, shape, condition, arrangement and material that the same may be safely employed in the active service of such carrier in moving such traffic without peril to life or limb."

This can be construed to mean that the entire locomotive is subject to the inspection of a boilermaker. The words, "other machinery and appurtenances thereof," include the whole locomotive, and if its construction does not suit the inspector, he can refuse a certificate and tie it up almost indefinitely.

Fusible Plugs.—These are not generally used on locomotive boilers in the United States.

Low-water Indicators.—It is very uncertain as to what is meant by the low-water indicator. I do not know of any low-water indicator used on locomotive boilers, except that the fusible plug could be included under this term.

Feed-water Apparatus.—This includes injectors, injector throttles, injector checks and piping. I cannot conceive how this can be included in safety appliances. All the inspection that could be made would not eliminate occasional failures in this apparatus and a failure would not endanger life or limb.

Low-water Gages.—These would be of the same character as low-water indicators. I have never heard of a low-water gage as a specific device used on locomotives. This sounds like a term from marine practice.

Means of Moving Mud and Sediment from Boiler.—It is safe to say that not 1 per cent. of the locomotives in the

United States have any means for removing mud and sediment from the boiler. The bill prescribes something which is not a part of the locomotive.

"All other machinery and appurtenances thereof are of such construction, shape, condition, arrangement and material that the same may be safely employed in the active service of such carrier in moving such traffic without peril to life or limb."

As before said, this may be construed to cover the entire locomotive. It specializes the "construction," "shape," and "material," and, furthermore, the relation of the parts of the locomotive are included under the word "arrangement." All of the foregoing is drastic, but the word "condition" makes it more so. If this bill is enacted into a law, railways will be at the mercy of the inspectors.

Section 2 pertains entirely to the purchase of locomotive boilers and the markings on them, prescribing that it shall be necessary for the purchaser to notify the seller that the boiler is to be used for locomotive service. There is no objection to this provision.

This section also provides that:

"It shall be unlawful for the seller of such boiler, after having been so notified, to sell such boiler to such carrier without each plate thereof is distinctly and permanently stamped by the manufacturer, and, if practicable, in such place that the marks shall be left visible, with the name of the manufacturer of such plate, the place where manufactured, and the number of pounds of tensile strain it will bear to the sectional square inch."

Having the plates stamped with the manufacturer's name and the place of manufacture has nothing to do with the safety of boilers, as the same manufacturer makes many different kinds of plates.

This Section also provides that the plates shall be stamped, showing the number of pounds of tensile strain it will bear to the sectional square inch. No one knows the number of pounds a sheet will bear to the sectional square inch until the sheet has been tested to destruction. At the best, the number that might be stamped on the sheet would be only an estimate, as it is well known to those experienced in testing sheet that the same sheet does not always have a uniform tensile strength throughout, and, furthermore, if the number of pounds designated as the tensile strength were known (and it is not known) it would be only a factor and would not designate the strength of the boiler to resist explosions, as a boiler is always rated at its weakest point. This weakest point may be in the rivets and not in the sheet. A sheet of the highest tensile strength could be made weak by the improper placing of rivets, or the improper punching of rivet holes, which cannot be detected by inspection after the boiler is built. To me, it seems that Section 2 is nonsense.

Section 3, page 3, lines 18 to 20:

"Once in every three months, at least, cause a careful inspection of each boiler and the appurtenances thereof of each such locomotive used in moving such traffic."

There is nothing provided in this proposed bill as to where the inspection shall be made. I suppose that it would be at a terminal point, and that it would require at least one day per boiler, and if it were practicable to have a boiler ready for test on exactly the three months' period, there would be only four inspections per year. As a matter of fact, it would be necessary to make the inspection in less than three months, in order that the engine might be returned from the road to the terminal and be inspected at a time consistent with the work in hand. If the inspector so elected, he could require the boiler to be stripped of all the lagging, the dome cap to be removed and possibly many of the flues. He could tie up an engine a week and put the company to an expense of \$200 or \$300.

There are many times in the last month's service of a set of flues that they leak more or less. This is no element of danger. Sometimes during the last month's service of a firebox it leaks. This also is no element of danger.

It is quite certain that should the inspection of an engine fall due near the time of renewal of flues or repairs to the firebox the inspector (to keep from being criticised) would refuse to issue a certificate. This would make it necessary to shop

the engine, when it was good for an additional four to six weeks' service. The result would be an increase in cost of locomotive repairs.

The bill is so drawn that an inspector could pass at any time on the construction of the boiler, and if it did not suit him he could condemn the boiler and a new one would have to be applied, as it is impracticable to remodel old boilers. The compilers of this bill should have made provision for a boiler to be inspected for construction and have a perpetual certificate issued for its use, as far as its features of construction are concerned, as it does in marine practice. If this were done it would make all subsequent inspections for safety only. It would be a great menace to the railways if their boilers were to be subject to the various opinions of different inspectors as to the constructional features.

On a basis of inspection at least every three months I estimate that each of our locomotives would be out of service four 24-hour working days each year. One of these four days would be taken care of by our regular general inspection, leaving three additional inspection days, which, for 1,000 locomotives, would make a total of 3,000 days a year of dead time due to this additional inspection. There are over 55,000 locomotives in the United States. This would mean on the same basis 165,000 additional days of dead time for all the locomotives in the country. This is equivalent to 420 locomotives tied up for one year. This many locomotives at an average of only \$12,000 each is \$5,040,000 added to investments in equipment. To this must be added the cost of at least \$10 to the railway for each boiler inspection by the federal inspectors.

Each of our locomotives receives an inspection at least every 30 days for staybolts. This consumes about three hours per locomotive, and when there is nothing defective found it does not delay the engine. This inspection would have to be made in addition to the federal inspection, unless the latter inspection came on a monthly period. If each locomotive boiler were not inspected for staybolts oftener than the maximum three months' period prescribed in the proposed bill, it would not generally be considered safe, but it does not follow that a boiler should be subjected to a severe general test more often than once a year.

Section 3, page 3, lines 21 to 25.

"When the inspection of such boiler and appurtenances has been completed and the inspector thereof is satisfied that they will meet all the requirements of this act and may be used with safety to life and limb, he shall approve the same by making and subscribing under oath a certificate."

From the foregoing it would seem that a certificate must be issued every time the boiler is inspected. We found it necessary to have boilers inspected at least every 30 days for staybolts, and if this interpretation is acted upon it will require a very large number of federal inspectors, one or more at every shop, and we would never be sure of the service of a locomotive, as it would depend upon the issuing of a certificate.

Section 3, page 4, lines 8 to 17:

"That if after such inspection has been completed such inspector is not satisfied that such boiler and appurtenances meet all the requirements of this act and that they may be used with safety to life and limb, he shall disapprove their use, giving to the carrier operating such locomotive his reasons therefor in writing; and it shall thereafter be unlawful for such carrier to use such locomotive until the boiler and appurtenances thereof meet all of the requirements of this act and have been approved in accordance with the provisions of this section."

This section of the bill puts absolute power in the hands of the inspector. There would be no appeal from his decision except to the courts. Nothing is said about referring the matter to a board of arbitration or to any other disinterested party.

Section 3, page 4, lines 18 to 21:

"That the inspector of locomotive steam boilers shall be a person who has been a practical boilermaker of at least four years' experience in the construction and repair of locomotive steam boilers."

It is reasonable to estimate that to comply with the requirements of this bill it would be necessary to have at least 600 inspectors for the United States. To intelligently pass on the

strength of boilers it would be necessary for the inspectors to have an education and knowledge of mathematics that is seldom found in practical boilermakers. Few practical boilermakers can make computations relating to the strength of boilers. It is exceptional to find one who does not consider matters of strength, from the standpoint of experience or by guess. Boilermaking is a very undesirable vocation, and educated men do not enter it. Therefore, it would be very hard to draw from this class of practical men those who are able to pass intelligently on the construction and strength of boilers as proposed by this act.

This section of the proposed bill goes so far into detail as to mention that the inspector, from his experience, should be able to form a reliable opinion of "arrangement of any part of such apparatus for steaming." The steaming qualities of the boiler have nothing to do with the hazarding of life or limb, being a matter of efficiency, and the question of safety does not enter into the case.

After carefully considering this proposed bill from an operating and mechanical point of view, the question can well be asked: Would government supervision and inspection of locomotive boilers as provided for in this bill afford the employees of railways or the traveling public any greater protection than they already enjoy? And would such protection be in any manner commensurate with the cost thereof?

The Statistics of Railways issued by the Interstate Commerce Commission for the fiscal year ending June 30, 1906, contains the following summary of persons killed and injured during the year covered by the report:

	12 months ending June 30, 1906.	
	Killed.	Injured.
Railway employees	3,929	76,701
Passengers and others	6,689	21,005
Total	10,618	97,706
Railway employees	39	126
Passengers and others	1
Total	39	127

The commission reporting to the senate under date of January 22, 1909, per Senate Document No. 682, shows the following

casualties and injuries chargeable to actual locomotive boiler explosions for the 12 months ending July 31, 1906:

	Killed.	Injured.
Railway employees	39	126
Passengers and others	1
Total	39	127

While there is a difference of one month in the period covered by the documents from which the data were obtained, the same number of months are covered. It is, therefore, not unfair to use the data thus obtained for the purpose of comparison.

Of the 3,929 railway employees killed during the year, 39 casualties were chargeable to locomotive boiler explosions, or 1 per cent, of the whole number killed. Of the 76,701 employees injured, 126 were chargeable to boiler explosions, or 1.6 per cent, of the whole number injured. Of the 6,689 passengers and others killed *not a single one* lost his life on account of a boiler explosion. Of the 21,005 passengers and others injured *but one* was injured on account of a boiler explosion.

According to the statistics of the commission for the year ended June 30, 1907, there were then 55,388 locomotives in the United States. As a basis for arriving at the number of government inspectors that would be required to properly inspect and test each of the 55,000 locomotive boilers—using round numbers—once every three months, or four times each year, we will assume that one inspector and one assistant could care for 100 locomotives without seriously delaying the power. On this basis, the total force of inspectors and assistants required to test and inspect 55,000 locomotives would be as follows:

Inspectors	550	at \$1,500 per annum
Assistants	550	" 750 "

(A very conservative estimate of salaries.)

Total for inspectors and assistants, per annum, \$1,237,500

This calculation does not take into account the cost of supervision, traveling and other absolutely necessary expenses that would have to be incurred by the government in order to carry out the provision of this bill. This expense would doubtless equal, if not exceed, the estimated salaries for the inspectors

and assistants. Assuming that it would be equal, the total cost of the service would, therefore, be \$2,475,000, or \$45 for testing and inspecting each locomotive four times per annum, or \$11.25 for each inspection. It is fair to assume that the extra expense to the railways would be an equal amount, making the grand total about \$5,000,000.

Conceding that the value of a human life should not be measured by dollars and cents, there is no getting round the fact that the system of inspection proposed would be very costly to the government, yet it might be justified if there was any positive assurance that the loss of life due to the explosion of locomotive boilers would be entirely prevented, but, it being well known that locomotive boiler explosions are frequently due to carelessness or neglect on the part of the men operating them, it must be admitted then that no system of inspection that can be devised by the government or the railways will entirely eliminate this source of trouble.

During the fiscal year ending June 30, 1908, with a total of almost 1,000 locomotives in service on this system, there was not a single boiler explosion—in fact, there have been but three actual boiler explosions on this system during the past 28 years, which attests to the efficiency of the existing system of boiler inspection. Notwithstanding this fact, during the year mentioned above, we had the boilers of 40 of our locomotives damaged by low water, due to the carelessness or neglect of the men operating them, which proves very clearly that the element of risk due to carelessness or neglect of operatives is many times greater than that due to inefficient inspection.

SUPERINTENDENT OF MOTIVE POWER.

Contributed Papers.

THE INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.

The fifth annual convention of the "International Railway General Foremen's Association" was held at the Lexington Hotel, Chicago, June 1 to 5.

At the opening session, after the address by the President, E. F. Fay (Union Pacific), Robert Quayle, Superintendent of Motive Power and Machinery, Chicago Northwestern, addressed the meeting on the subject of cordial relations between officers and employees. There was also a short address by Angus Sinclair.

A report on "Air Brake Equipment" was presented by C. H. Voges, Chairman. The report considered the subject under three headings: First, the advantages of equipping engines in heavy passenger and freight service with two 9½-in. air pumps. Second, straight air equipment and its advantages. Third, the triple valve cleaning and repairing.

In the discussion of the first item there was a general sentiment in favor of the use of two 9½-in. pumps for heavy passenger and freight service in preference to one 11-in. pump. The report states that the average life of a 11-in. pump in heavy brake service before it requires repairs is from 5 to 7 months, and the average maintenance cost per year is \$32 per pump. The maximum capacity of this pump with 100 lbs. air pressure and 200 lbs. steam is about 57 cu. ft. of free air per minute. Under the same conditions two 9½-in. pumps will compress 70 cu. ft. per minute and the steam consumption per cu. ft. is practically the same in each case. The two 9½-in. pumps can be kept in service 18 months and the cost of maintenance per year for the two pumps is \$20.

Regarding the use of straight air.—This also was generally favored, and it was shown that it could be used with safety on grades to advantage and that it greatly reduced tire wear. It permits the brakes to be released on long trains without danger of the slack running out suddenly and breaking them in two. It is very efficient in slowing up or stopping trains where the brake work required is not heavy. This reduces the pump work, the number of stuck brakes while sliding and

the break-in-twos incident to the endeavor to start long trains with brake shoes dragging or stuck brakes at the rear. The straight air is a great factor in making smooth stops with passenger trains and in holding passenger trains on grades after automatic brakes are released. It decreases the wear of locomotive valves and cylinders by eliminating the need of reversing when in motion, which is found necessary with the automatic brake because of its comparatively slow recharging properties.

The report favored the repair of triple valves only in the air brake department and only by expert men. When cleaning is necessary the triple should be taken from the engine and replaced by a repaired triple. When the piston bushing needs renewing the triple valve should be returned to the manufacturers for repairs, as they are better equipped for this work than most railway shops.

As a result of the discussion a resolution was adopted as a sense of the meeting, first, that the subject of the use of two 9½-in. pumps, or their equivalent be recommended for further investigation; second, that the dual use of automatic straight air on engines be recommended; third, that the triple valve and the air pump should be maintained in the highest state of efficiency.

Under topical discussions a paper was read on "The Best Method of Arriving at the Cost of Repairs," by H. D. Kelly. The principal point in this paper was that foremen should be advised of what repairs are necessary before an engine is sent to the shop, and that foremen's meetings should be held regularly once a week.

In the discussion the question of the best method of detecting broken driving axles was brought up. One member said that on the lighter power he made a practice of moving the driving wheel off the axle about 1 in. in order to see if there were any seams or cracks directly inside the fillet at the wheel side, and often discovered them in that way. The representative of the Illinois Central said that this road had a rule of limiting the mileage of axles to 250,000 miles, or wear ¾ in. in diameter. The Big Four makes the mileage limit 400,000 miles.

At the meeting on June 2 a paper was read on the "Coaling of Engines and Mechanical Devices," by W. H. Clow, General Foreman of the Erie, at Hammond, Ind. This paper reported the use of a crane and clamshell bucket which had handled 40,000 tons of coal from a pile on the ground to engines and cars at a cost of 2 cents per ton. This required two crane engineers and two firemen and two men on the ground to follow up the machine. At Hammond, Ind., the crane has been used for three years, and the cost has been from 5 to 7 cents per ton, including the loading of ashes. At 47th street roundhouse, Chicago, two machines are used by the Chicago & Western Indiana at a cost of 7.6 cents per ton, and the amount handled is from 9,000 to 10,000 tons per month. This cost includes the wages of the shop yardmaster, one-half a hostler's time for handling shop engines, switching coal and cinder cars, two clamshell operators' wages, one day and one night, and the repairs of the clamshell.

At the same session a paper was read on the "Best Method of Handling Engines at Terminals," by T. H. Ogden, General Foreman of the Santa Fe, at Dodge City, Kan. This paper favored the hot water system of washing boilers as the most economical in saving time, labor and material. It reported that very large engines are turned in 4 hours and 45 minutes, including a thorough washing of the boiler. The average cost of handling an engine at Dodge City for mechanical work was \$1.70 per engine handled. The average cost for knocking fires, cleaning ash pans, including the loading of cinders in cars, all done by hand, was 30 cents per engine handled. The average cost for all handling of engines, including hostlers taking coal, sand, water, removing and replacing supplies and cost of drying sand, is 35 cents per engine. The paper favored the merit system as an incentive for every man to put forth his best efforts to do his work quickly, thus increasing his pay

and increasing the output and going a great way toward solving the problem of handling engines at terminals.

On the morning of June 3 three papers were read on the advisability of installing a hot water boiler washing and refilling system. The first paper by E. A. Murray, Chesapeake & Ohio, Covington, Ky.; the second by R. W. Wood, Chesapeake & Ohio, Clifton Forge, Va.; and the third by Luther H. Bryan, Duluth & Iron Range, Two Harbors, Minn. All these papers pointed out the advantages of the hot water system for washing out where large storage tanks are used. Probably the most important advantage of this system is the rapidity with which the work can be done, as the engine can be got into service from 2 to 3 hours quicker than is possible with the cold water system. The hot water method requires only about two hours, while the cold water method requires from 6 to 8 hours. By the hot water method the noise of blowing off is reduced so that it is hardly noticeable. The water for washing out and filling is heated without extra cost for fuel. The papers concluded that the saving obtained by this method would be good interest on the investments. In the discussion there was a general sentiment in favor of hot water washing, and it was considered of sufficient importance to continue the subject until next year.

Mr. White, of the National Boiler Washing Company, was invited to explain this company's system. He exhibited a fine photograph of the plant recently installed on the Santa Fe at Newton, Kan., and pointed out the different details of the apparatus and its method of operation. He reported that the New York Central has 17 plants, the Big Four 18 plants, and the Santa Fe 3 plants for washing out by this system.

In the afternoon the subject of acetylene welding was discussed. A representative of the Great Northern explained a system which it is using with success, and after adjournment the members were taken to see a demonstration of acetylene welding by the Chicago Welding Company. The welding of the boiler works in place was regarded as somewhat experimental, and it was thought advisable to continue the subject for discussion at the next convention.

A paper on the casting of the brass in a driving box was read by A. O. Berry, of the Lake Shore, and an explanation given of the method used. At the Elkhart shops of this road the boxes are slotted with dove-tailed grooves and the brass is cast in with the hubliner included. This method has already been explained in the *Railroad Age Gazette*, April 16, 1909, page 862, in an article about the Alton shops at Bloomington. Under this subject reference was made to the method used by the Chicago & North Western in which the driving journal brass is slipped into the box when the wheels are in place, and is held by a long tapered key or wedge. The device is known as the Markle removable driving box bearing, and is quite generally used by the North Western, and is illustrated in the *Railway Age*, October 25, 1907, page 598.

At the morning session on June 4 it was suggested that car foremen and car repairers be given more prominence in the association; that papers and discussions relating to car repairs form a part of the proceedings. It was also suggested that it was advisable to arrange, if possible, that the place of meeting be the same as that of the Master Boiler Makers Association, and that the two associations meet the same week. A paper was presented on the best method of getting work through the shop with economy and despatch, W. C. Stears, Chairman. The paper recommended that the work should be specialized. The rod work, steam chests, links, rocker boxes and pistons should be handled by different gangs with working foremen. It was also recommended that all these details should be maintained as standard for the different classes of engines. A stripping gang of handy men should be organized who should do sufficient stripping to get the engines off the wheels; namely, drop pedestals, binders, rods and brake rigging. All other stripping should be done by the machinists working on the engine.

The next paper on the programme was on the best ar-

rangement of ash pans so that cleaning would be done in conformity with the federal "ash pan law." Two papers on this subject were read, one by E. C. Hanse, and the other by W. E. Dunkerley. Mr. Hanse stated that the Seaboard Air Line has adopted the slide bottom ash pan as a standard on all its engines with hopper pans. This is regarded a successful device. The cost is \$15 per engine. The same line has equipped engines with low ash pans with a blow pipe in the front section. An inch and a quarter globe valve is fitted into the boiler head on the left end side below the water line and an inch and a quarter pipe is run down through the deck and reduced to 1 in. in the pan. A shield of $\frac{1}{2}$ in. tank steel is fastened to the frame between the main pedestals, far enough back to clear the eccentric and far enough forward to allow the front damper to open. The object of this shield is to protect the machinery from the clinkers blown out of the pan. This device can be applied to an engine for about \$5. It is found of great advantage on fast trains where the coal is bad, as the firemen can keep the pan clean without any delay, and it can be worked from the cab with safety. On other engines the end of the blow pipe is fitted with an oblong casting about 6 in. wide, which forms a broad nozzle and spreads the water in the pan.

In the discussion of the subject there seemed to be some confusion in regard to the requirements of the law with respect to the use of the pans on the road and at clinker pits. Some members thought that it would not be unlawful for men to go under the engine at clinker pits, and that an ash pan might be used which would not clear large clinkers without being removed by hoe at the clinker pit. The law is very definite in this respect, as it says that it is "unlawful for a railway to use any locomotive in moving interstate or foreign traffic not equipped with an ash pan which can be dumped or emptied and cleaned without the necessity of an employee going under such locomotive." The discussion disclosed the fact also that there is quite a diversity of opinion and practice as to the best design of ash pan for this purpose. Some roads have adopted slide bottom ash pans, while others have adopted drop bottom pans. For the slide pans steel castings for the guides and frame work were recommended, as they do not break so easily as cast-iron when the pan is warped. The majority of roads using slide bottom ash pans have them equipped with steam heaters.

A motion was adopted instructing the Secretary to request members to send drawings, showing the kind of improved ash pans they are using in order to conform to the law, and that copies of these prints be sent to the railway technical papers for publication so that the members may be informed as to the practice on different roads.

It was decided to hold the next meeting of the Association at Cincinnati, Ohio. The following officers were elected for the ensuing year: President, T. H. Ogden (A. T. & S. F.); First Vice-President, C. H. Voges (C. C. C. & St. L.); Second Vice-President, P. F. Griffin (C. C. C. & St. L.); Third Vice-President, William Hall (C. & N. W.); Fourth Vice-President, J. A. Boyden (Erie); Secretary and Treasurer, Luther H. Bryan, Duluth & Iron Range.

The following is a list of exhibitors, together with an enumeration of the articles and devices that they had on display, and the names of their representatives:

Adreon Manufacturing Co., St. Louis, Mo.—Campbell graphite lubricating system; Westinghouse universal ball joints; American gravity couplings; Security back up valves and Security bell ringer. Represented by William Miers.
 Ajax Valve Co., Chicago, Ill.—Ajax metal valves. Represented by A. C. Ricksecke and C. G. Poirier.
 American Locomotive Sander Co., Philadelphia.—Sanders. Represented by Morris P. Brewster.
 American Steel Foundries, Chicago.—Simplex couplers, brake-beams; Andrews side-frame and Simplex trucks. Represented by W. G. Wallace, H. K. Shaw and C. C. Hopkins.
 Armstrong Bros. Tool Co., Chicago.—Armstrong tool holders. Represented by Paul Armstrong.
 Charles H. Besly & Co., Chicago.—Represented by C. A. Knill.
 S. F. Bowser & Co., Fort Wayne, Ind.—Bowser system of oil storage. Represented by J. L. Handy and W. T. Simpson.
 Buda Foundry & Manufacturing Co., Chicago.—Locomotive and car jacks. Represented by A. R. Dyer and Lawrence Hamill.
 Celfor Tool Co., Chicago.—Tool steel. Represented by J. J. Dale.

Chicago Railway Equipment Co., Chicago.—"Creco" hollow brake-beam. Represented by G. N. Swerling.

Detroit Lubricator Co., Detroit, Mich.—Detroit sight feed air cylinder lubricator for lubrication of the air cylinder of locomotive air-brake pumps. Represented by A. D. Howard and W. O. Bryant.

Joseph Dixon Crucible Co., Jersey City, N. J.—Dixon's graphite productions. Represented by B. B. Worley.

Fairbanks, Morse & Co., Chicago.—The Duff-Bethlehem forged steel hydraulic jack. Represented by R. E. Derby.

Firth-Sterling Steel Co., McKeesport, Pa.—Represented by William Nelson.

Flannery Bolt Co., Pittsburgh, Pa.—Tate flexible staybolts. Represented by W. M. Wilson, Chicago.

Garlock Packing Co., Palmyra, N. Y.—Packings. Represented by J. P. Landreth.

Gold Car Heating & Lighting Co., New York, N. Y.—Combination pressure and vapor system of car heating. Represented by F. M. Ivers.

Goldschmidt Thermit Co., New York, N. Y.—Thermit process of welding, and ash pan to meet requirements of federal law. Represented by Henry S. Mann and A. M. Guenther.

Greene, Tweed & Co., New York, N. Y.—"Palmetto" and other packings. Represented by F. E. Ransley.

Grip Nut Co., Chicago.—Grip nuts and Universal window fixtures. Represented by E. R. Hibbard, Herbert Green and B. S. McClellan.

Hunt-Spiller Manufacturing Corporation, South Boston, Mass.—Gun iron for locomotive castings. Represented by J. G. Platt.

Jenkins Bros., New York.—Valves and fittings. Represented by B. J. Neely.

H. W. Johns-Manville Co., New York.—Packing. Represented by J. C. Younglove, F. F. M. Gilmore and Fred Jacob.

The Leslie Co., Lyndhurst, N. J.—Leslie reducing valve for steam or air. Represented by J. J. Cizek.

Marshall & Huschart Machinery Co., Chicago.—High speed shop tools. Represented by H. W. Jones, J. R. Porter and J. G. Klaiber.

Nathan Manufacturing Co., New York.—New "Bulls Eye" lubricator; Reflex water gage and "Simplex" patent locomotive injector, type "R." Represented by C. A. Nathan.

National Boiler Washing Co., Chicago.—Photographs. Represented by E. B. White.

The National Malleable Castings Co., Chicago.—Sharon coupler. Represented by Roy Wright.

The Ohio Injector Co., Chicago.—Locomotive lubricators. Represented by F. W. Edwards.

The Pilliod Co., Chicago.—Pilliod locomotive valve gear. Represented by Henry J. Pilliod.

Pyle-National Electric Headlight Co., Chicago.—Electric headlight. Represented by Mark A. Ross, H. B. Bayley and J. W. Johnson.

Safety Car Heating & Lighting Co., New York.—"Pintsch" single mantle lamp and car heating appliances. Represented by D. W. Bergstrom.

Scully Steel & Iron Co., Chicago.—Simplex jacks, valves and Wrangler rotary beveling shears. Represented by H. H. Gilbert.

Spencer Otis Co., Chicago.—Illustrations of the Detroit car door. Represented by Carter Blatchford.

U. S. Metallic Packing Co., Philadelphia.—Packings. Represented by Morris P. Brewster.

Horace L. Winslow Co., Chicago.—Clark blow-off system for removing sludge, stop foaming and preventing scale. Represented by H. L. Winslow.

COMPARISON OF LOCOMOTIVE BUILDING IN THE UNITED STATES, GERMANY AND FRANCE.*

BY MARCEL BLOCH,

Motive Power Inspector of the Paris-Orléans Railway.

During the last few years French railways have purchased in Germany and in the United States a certain number of locomotives at more satisfactory prices and deliveries than those offered by French builders.

It is the purpose of this article to investigate the various causes that justify this difference in price and delivery by comparison of locomotive building methods and conditions in the United States, Germany and France. We will consider the questions of earlier delivery and lower factors separately, although it is clear that both are inseparable factors. A company crowded with work will naturally demand higher prices than one lacking orders, and, of course, the delivery will be earlier for the latter than for the former.

The requirements of each country have been responsible for the erection of shops whose size is proportionate to the local demand. Considering only standard gage locomotives, it would appear that the United States, with two large companies and a few of minor importance, has an average yearly capacity of over 5,000 locomotives; the 14 German locomotive works can deliver each year 2,000, while in France, with 6 builders, only 400 engines are built yearly.

Consequently, although, in the United States and Germany it is possible for the locomotive industry to be specialized, this is not the case in France, where all builders of locomotives find it necessary to engage in other work at the same time. For example, the *Société Alsacienne* builds stationary engines, electric motors, turbines and looms; the *Fives-Lille Company*

builds turbines, sugar refining machinery, bridges; the French Mechanical Construction Co. builds bridges, freight and passenger cars, shop machinery, etc., without mentioning the Creusot Company, the Batignolle Works and the French-Belgian Company, which are all in the same condition. The locomotive is a somewhat difficult machine to build, for prices are very closely discussed in France and inspection is very severe, and these requirements naturally cause French builders to devote themselves preferably to other mechanical work. This peculiar situation appears to influence both price and delivery to a very great extent.

Having thus briefly exposed the purpose of this article, the writer will now consider in detail the methods pursued in the three countries, with illustrations taken from actual observation in different shops. The comparison being based only upon the construction of a locomotive of the French type, the writer need not take into account the great advantage possessed by American and German builders when building locomotives of their own standard type, frequently duplicated.

EARLY DELIVERY.

Every locomotive building plant consists of the same number of departments—namely, main offices, drawing room, power house, pattern shop, foundry, blacksmiths' shop, boiler shop, machine shop and erecting shop.

These departments will be considered successively in the above order, without going into details familiar to most readers, and the writer will note only the characteristic differences of execution obtaining in the different countries:

Main Office.—Americans, being men of action, always wish to accomplish things rapidly; they think and act rapidly and always seek the shortest way of reaching the desired result. It is always more important in the mind of an American to obtain results rapidly, even if in some cases better results could be obtained by slower methods. This accounts for the rapidity of execution in all American offices, so surprising to a European. As an example, take the handling of incoming mail at the Schenectady Works of the American Locomotive Company. The letters arrive at 7.30 a.m., brought by one of the company's messengers from the post-office. They are immediately opened in the mail room and distributed by boys 13 to 15 years old to the various departments, where such replies as can be decided immediately are dictated at once to stenographers. When a reply requires careful deliberation the clerks at once obtain the desired information, and as soon as received dictate the letters and send them up ready for signature. All the higher employees are authorized to sign for the manager, and write the latter's name with their initials after it. Outgoing mail is then carried to the mail room and posted. Extensive use is made in America of the telegraph and telephone, which are much more readily accessible than in Europe on account of the greater number of lines and competing companies. Americans appear to use them, regardless of cost, which is much higher than in France. All large plants have their own telegraph operator, and generally lease a special wire, connecting them with New York or Chicago, according to their location. With such an organization it is easy to understand how rapidly replies can be received, particularly when the use of the signature is distributed among so many different employees. Replies are often made over the telephone or telegraph. Papers, letters, etc., are carried from and to the various departments by messenger boys, 13 to 15 years old, one of whom is assigned to every foreman's office.

Both in France and Germany the office system is much more complicated. Confidence in the ability of subordinates is much more limited and individual responsibility is less general than in America. In the latter country each man is responsible for his own actions, while in Germany and France the chief of the department bears the full burden; this method necessitates a large amount of checking, inspecting, corrections, etc., which, while they have their advantages, naturally greatly lengthen the time required.

*Translated from the *Revue Générale des Chemins de Fer*.

From the point of view of rapid production the American system certainly presents very great advantages.

DRAFTING DEPARTMENT.

American drawing rooms are organized in a very remarkable manner, and always greatly impress the European who has occasion to visit them. The work is gotten out in the following order, when, as generally practised in America, the builders furnish their own working drawings and design their locomotives themselves:

The chief draftsman gives the principal data of the engine to be designed to one of his leading draftsmen, and the latter, with one or more assistants, establishes the design and passes it on to one of the detail draftsmen, each one of which completes the design of that part which is his specialty. Detail draftsmen are divided in departments, as follows:

1. Boiler, ash pan, firebox.
2. Frames and crossties.
3. Cylinders, steam pipes.
4. Rods, pistons.
5. Motion work.
6. Suspension, wheels.
7. Tenders.
8. Runboards, cabs, pilots, etc.

For the delivery of these drawings to the different shops each one of the above departments follows a rigorously established order issued by the superintendent of the drawing room. This order, in tabulated form, gives the maximum number of days which must elapse between the delivery of drawings to the shop and the complete termination of the first engine of lot. The delivery of these drawings is therefore based upon the delivery of the first engine. Each draftsman makes his own tracings, which saves him from completely finishing his pencil drawings; being in possession of all details it is easy for him to finish his tracing even from a mere rough sketch. In this way the position of tracer is suppressed, with corresponding saving of time and force. Lastly, a very complete system of classification by numbers of all drawings permits the draftsmen to refer with great facility to previous similar drawings for guidance. A great number of fittings such as cocks, small shafts, etc., does not vary from one type to another, and for such there exists a collection of "standard drawings" which greatly facilitate the work.

In Germany and France, two or three draftsmen get up the design of a locomotive complete. Their drawings are not transmitted to the tracers until they are complete in every detail. The only difference existing between French and German drafting methods is the more extensive use in Germany of the standard drawings. This is accounted for by the fact that the German locomotive is much simpler than the French and that German builders, being allowed a much greater latitude in the matter of details, generally base new designs upon those of locomotives built, thus enabling an entire design to be gotten up in much less time.

MATERIAL ORDERS.

It is clear that the greater a country's production of raw material, the easier it is for builders to obtain their supplies. In this matter there is an enormous difference between the United States, having an annual production of 25,000,000 tons of cast iron, Germany with 10,000,000 tons per year, and France with only 3,000,000. It is clear that French builders, all other conditions being equal, are greatly handicapped by long delays in the delivery of raw materials.

In all three countries as soon as the draftsmen have finished their work, the chief draftsman receives from them a complete statement of raw material required, which is transmitted to the purchasing department.

The rapidity in getting out drawings, as well as the small amount of checking and inspecting to which American work is submitted, permits them to get these material sheets out much sooner than their European colleagues. The purchasing department immediately gets in touch with makers of material, in Europe as in America. But the centralization of sim-

ilar industries in the large New York and Chicago office buildings singularly facilitates and expedites the transaction between builders and supply houses. A single building in New York, for instance, such as the Hudson Terminal building, contains the offices of the American Locomotive Company, the Carnegie Steel Company, the Worth Brothers Company (steel plates), the Railway Steel Spring Company, etc. In a few minutes orders can be placed for plates, axles, tires, wheels, etc., after short interviews with the manufacturers, and without exchanging letters or telegrams. The rapidity with which these orders are placed is further enhanced by the extraordinary capacity of American shops, which can obtain from the manufacturers contracts for a certain period of time, enabling them when placing the order simply to state the amount and delivery required. The Pratt & Letchworth Company and the Union Steel Casting Company may be quoted as examples; these companies furnish the American Locomotive Company's steel castings almost exclusively. In Germany some of the locomotive builders, such as Henschel and Borsig, are manufacturers of their own raw material. Others obtain theirs from the manufacturers in Ruhr and Schleswig and must bargain with the latter for prices and deliveries.

In France, with the exception of the Creusot Company, no builders produce their own materials, and it appears that every order placed must be specially negotiated with the manufacturers.

These different conditions naturally have a great influence on the dates of deliveries. As a general impression, I should say that in the United States the capacities of plants are designed not for supplying the average demand of the country for such products, but for maximum requirements, when the country is in full prosperity. It is therefore clear that orders placed during a time of medium prosperity can be executed very rapidly by companies thus equipped. Of course, the execution of the recent order placed by the Paris-Orleans Railroad with the American Locomotive Company for 30 Pacific type locomotives cannot be taken as a conclusive demonstration of the early deliveries possible in America, for it was placed during a period of general depression, when orders were lacking everywhere. It is, however, interesting to note that the Worth Brothers Company started rolling the steel boiler and tank plates for this order on the same day that the telegram giving them the order was received, and that the entire order was executed in three weeks' time. Mr. Garbe, General Manager of the Prussian State Railways, says in his recent work, "Die Lokomotive der Gegenwart," that when rush orders are placed American locomotive builders can be in receipt of the boiler steel within five days, and that four days later cast steel side-frames can be ready for slotting.

In Germany these deliveries are much less rapid. The large orders placed by the navy often crowd manufacturers to their full capacity. For such builders as Henschel and Borsig this difficulty is avoided, as they can place their orders ahead of others, being the owners of their own material supply shops. The following example may be quoted: A number of plates having been ordered from the Borsigwerk (Schleswig) the latter was able to submit for inspection 30 boiler plates which had been rolled during the night. This happened during a period of great activity and was only rendered possible by the issuing of special orders to the works to get these plates out ahead of any other orders they might have on their books. As a general rule, however, German manufacturers are able to deliver their material in good time and night work is always done during prosperous times.

In France the mills are less well equipped than in Germany. In normal times they are able to offer satisfactory deliveries, but as soon as orders increase become congested with work and the shipments are delayed, often for several months. For boiler and frame plates the shipments vary from three weeks to four months, according to the amount of work in hand.

SHOP PRACTICE.

It is not the writer's object to go into intricate details of shop construction; this varies very greatly and is entirely dependent upon local conditions. For instance, the American Locomotive Company has been able to extend its works at Schenectady, having ample property at its disposal, while the Baldwin Locomotive Works, being hedged in at Philadelphia, has been obliged to seek additional shop space by superposition of several stories. However, on account of their larger capacities, American and German builders have been able to expand their shops much more than it was possible in France.

(To be continued.)

THE GALVESTON CAUSEWAY.

BY F. E. LISTER,

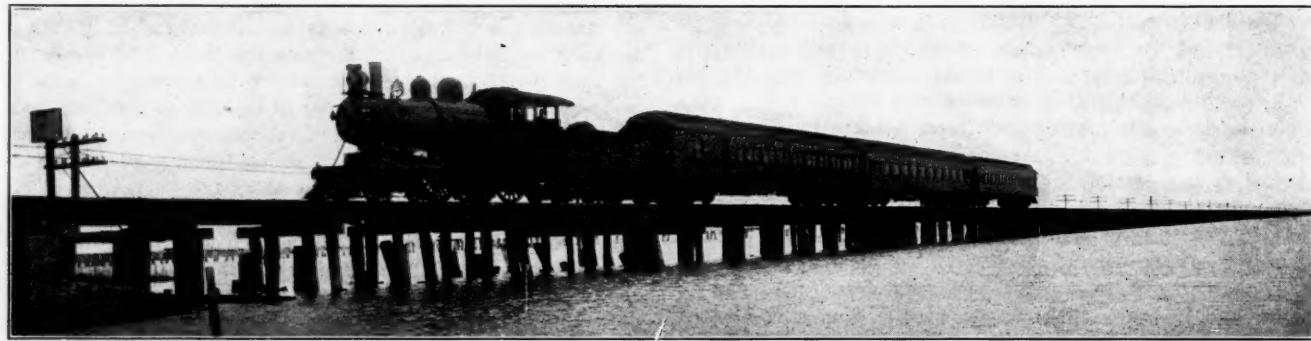
Associate Editor, *Railroad Age Gazette*.

Previous to the storm at Galveston, Texas, on September 8, 1900, when some 6,000 lives and about \$17,000,000 in property were lost, three railway trestles—used by the Galveston, Houston & Henderson, the Galveston, Harrisburg & San Antonio and the Gulf, Colorado & Santa Fe—and a county highway bridge, linked the island and the main land, which are, at this point, more than 10,000 ft. apart. During the height of the storm, an ocean liner broke away from its anchorage at one of the piers, was carried up the bay with such terrible

from 60 to 75 trains cross the bridge daily, while the regular bay bridge time car, which went into effect on May 3 last, shows 45 trains scheduled per day. This, however, is undoubtedly the schedule of the summer months, the quiet period of the year, the busy season being during the cotton moving time, from the latter part of August to March.

The building of the causeway to connect Galveston Island and the main land of Texas, near Virginia Point, is by no means a new idea, but has been agitated with more or less vigor by the city ever since the storm. On September 1, 1904, the *Galveston News* said: "It is understood that plans are being perfected for the construction of this causeway and certain authorities known to be interested in the movement have stated that everything is working smoothly and that some definite announcement may be expected very soon." On April 26 last proposals to contractors were published from the office of John M. Murch, Auditor of Galveston county, and bids will be received until June 28.

The center line of the causeway will be located, beginning at a point 314.2 ft. southwest of the Galveston end of the present trestle, and end 82.4 ft. southwest of the main land end of the trestle. The entire structure will consist of a concrete-steel arch bridge, a bascule or lift bridge and a roadway. The lift bridge located near the center of the arch bridge, having a clear opening of 100 ft., when closed will have a span of about 125 ft. between supports. The arch bridge will have a total length of 2,472 ft., from back to back of end abutments. That



Present Single Track Trestle Across Galveston Bay.

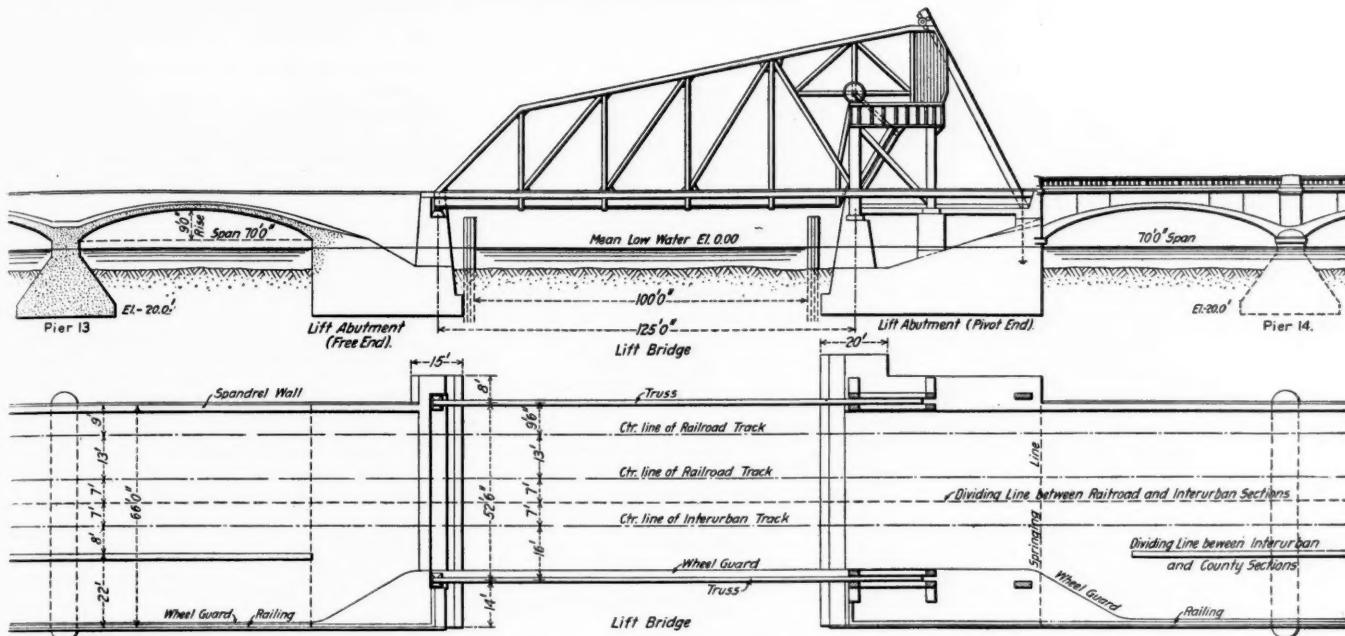
Over two miles long. Only connection between main land and island. Piles of another trestle, destroyed during the storm, seen in the distance. force that it plowed through the trestles and county bridge. One of the railway trestles, that of the Gulf, Colorado & Santa Fe, was less seriously damaged than the others—which were completely demolished—and it was rebuilt in nine days. Since that time, all of the railways entering Galveston have used this single track pile bridge, which has a Howe truss swing draw at the channel to permit small sailing vessels to go up the bay. The accompanying half-tone shows the general appearance of this trestle, and in the distance may be seen what remained of the other trestles after the storm.

There are three separate railways entering Galveston; the Galveston, Houston & Henderson—which affords trackage rights from Houston to the International & Great Northern and the Missouri, Kansas & Texas—the Gulf, Colorado & Santa Fe and the Galveston, Harrisburg & San Antonio. The Trinity & Brazos Valley uses the G. C. & S. F. tracks to Virginia Point at the main land end of the bridge, but has its own terminals in Galveston. The G. C. & S. F. owns and operates the bridge, the expenses being borne, on a wheelage basis, by all the railways using it. The staff system of operation is used, passenger trains requiring 10 minutes and freight trains 15 minutes in crossing. An operator at Virginia Point has charge of all train movements. As there is but a single track, there is always more or less delay, although passenger trains are seldom delayed more than five minutes, while freight trains are often seriously so, especially those which reach the bridge between 7.30 and 9 a.m., and between 4.30 and 6.30 p.m., when passenger trains are numerous. During the busy season

part of the roadway at the Galveston Island end of the causeway will be about 4,530 ft. long, while that part of the main land end will be about 3,640 ft. long. The entire causeway will be 10,642 ft. long. The roadway will be 119 ft. wide at top, the arch bridge will be 66 ft. wide, and the lift bridge will be about 52 ft. wide, between center lines of outside trusses. Reference to one of the accompanying cross sections of the structure will show that provision is made for two steam railway lines, one interurban line and a county roadway.

The bascule bridge, as seen on the plan, is 14 ft. narrower than the arch bridge and this difference is taken off of the county roadway section. The one shown in this elevation is not the final design, but merely shows the general appearance of the lift which will be used. The end piers under the bascule span are seen to be combined with the abutments of the arches. The line loading assumed for the structure is Cooper's E-50 for each track, and 150 lbs. per. sq. ft. of roadway for the highway portion. The structure is in general, designed according to the specifications of the American Railway Engineering & Maintenance of Way Association for steel bridges and structures. The bascule will be a thorough structure carrying two steam and one interurban track and the county road. On account of climatic conditions, when metal work rusts rapidly, care must be exercised in the use of closed or box sections or any detail where moisture can collect.

The lift bridge will be protected by an all-electric interlocking plant, in accordance with specifications of the Signal Association, dated October, 1908. The specifications for the

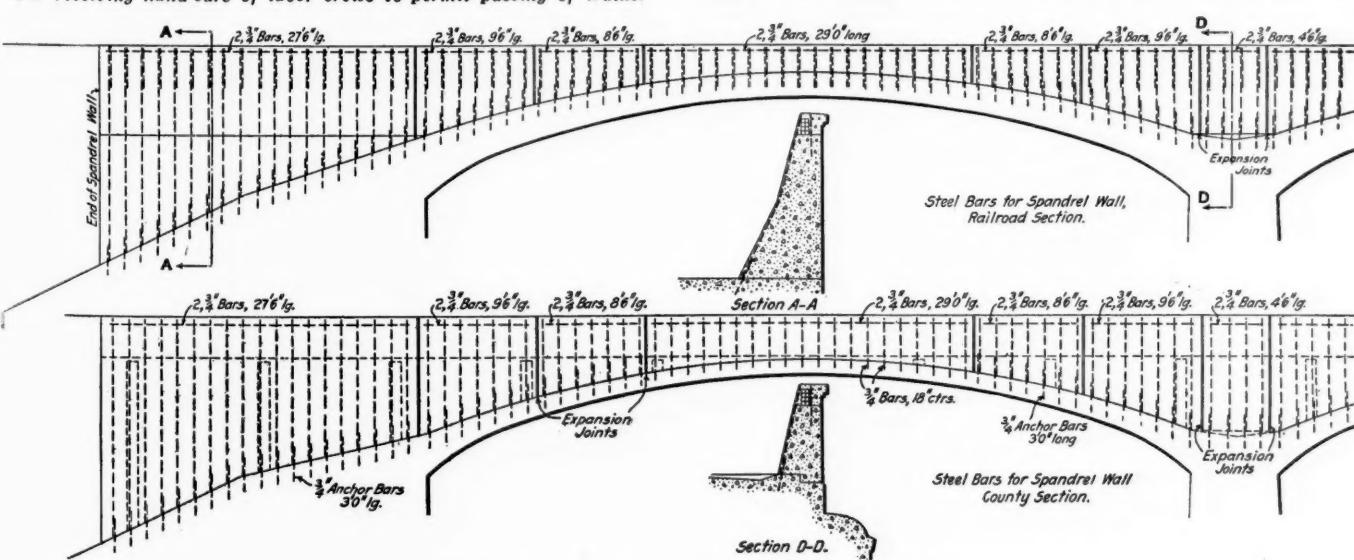


Plan and Elevations at Bascule Bridge.

The pile foundations of piers are not shown. Height of base of rail above M. L. W. is 16.5 ft.

bascule bridge and the interlocking plant were made by A. F. Robinson, Bridge Engineer System, A. T. & S. F., Chicago.

The foundations for abutments, piers and abutment-piers will be placed upon barked, yellow pine, vertical and batter piles, as shown in the illustrations. These piles will be between 12 in. and 16 in. in diameter at the large end, not less than eight in. in diameter at the bottom, and 30 ft. long. These piles will be driven until the butt end projects 18 in. above the bottom of foundations. Jetting of piles will be permitted only in case the required penetration cannot be secured by other methods. The last four feet of penetration will be sufficient in all cases, but where greater lengths are found necessary they will be used. About 40 borings were made along the line of the causeway to determine the nature of the foundation soil. From these borings it is expected that yellow clay, with occasional sand pockets, will be found overlying hard red clay in all foundation pits, and that red clay will have been reached at the bottom, as it is intended to rest all foundations on red clay. Suitable cofferdams, made of tongued and grooved sheeting, will be built for the piers and abutments. The 28 arches of the arch bridge are divided by the abutment-piers into four series of seven each. On account of the flatness of the arches, no centering under any arch of any one



Sections and Elevations of Spandrel Walls.

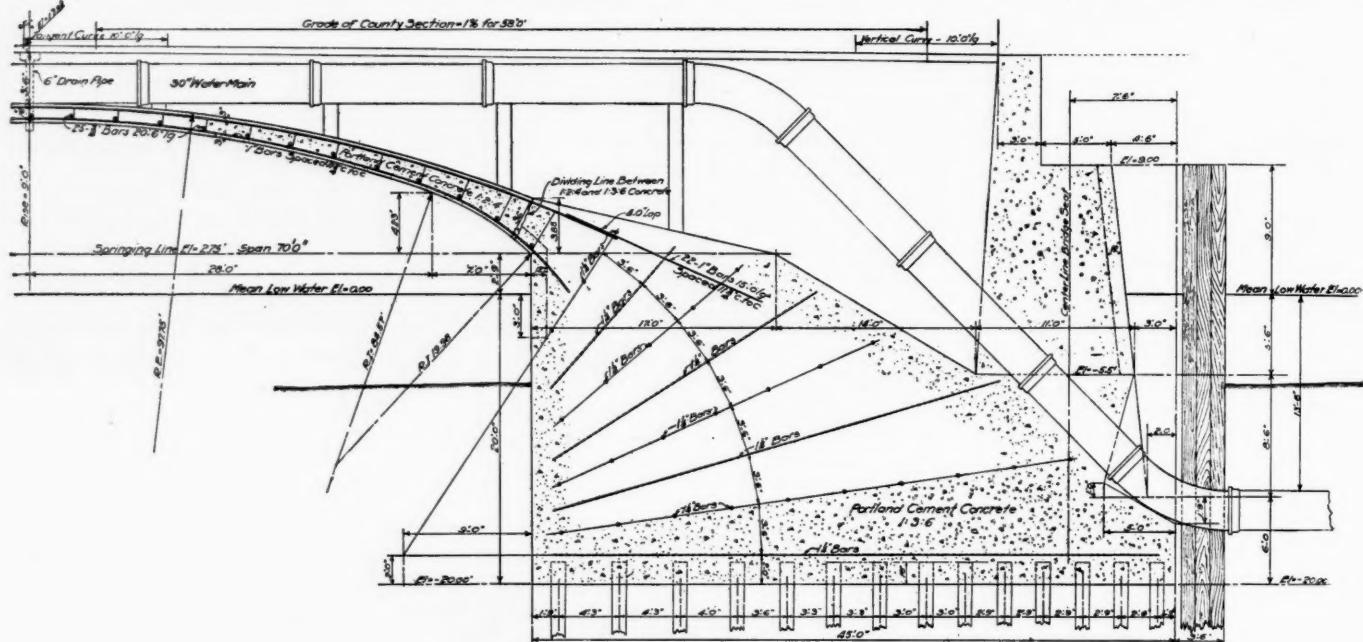
Showing method of reinforcing. Railway section above and county section below.

series shall be struck until at least 28 days after the completion of all seven arches of that series, and not until the spandrel filling has been put on. Each arch will have approximately the following dimensions: Span, 70 ft.; rise, 9 ft.; height of soffit above M. L. T., 12 ft.; height of base of rail above M. L. T., 16.5 ft., and extreme width over spandrels, or headwalls, 66 ft.

In order to obtain a smooth and satisfactory finish on all concrete surfaces exposed to view, the forms will be plastered

above the elevation of the bottom of wire ducts and for all parapet walls and railings. Grade "b," 1-3-6-mix, for foundations, abutments, abutment-piers, piers, spandrel walls, and all other concrete.

Steel ribs will be embedded in the concrete of the arches, spaced at equal distances apart. Each rib will consist of two deformed bars, connected by radial connecting rods. Diagonal connecting rods will be used for holding the ribs in position. All connecting rods will be plain steel bars provided with

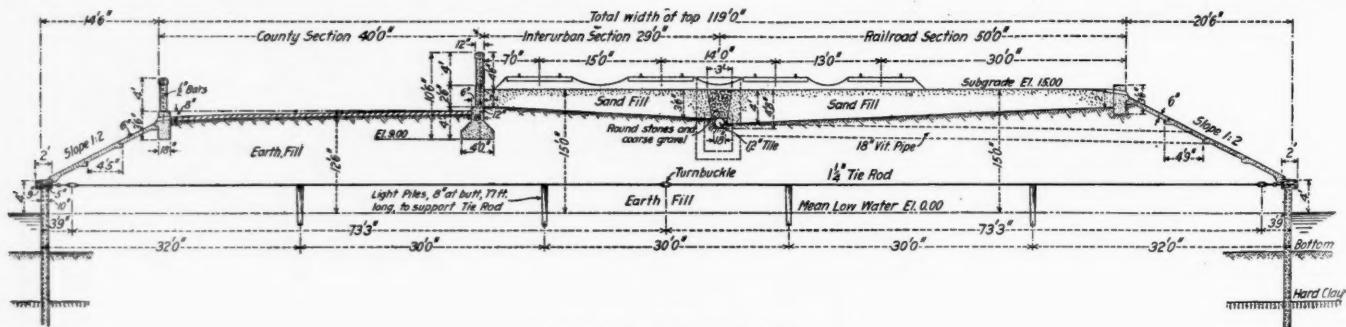


Section at Lift Abutment Pier.
Showing fall of 30-in. water main to cross the ship channel.

to a smooth finish with rock plaster, stucco, or other plastering material. Before the concrete is deposited against the forms, the plastered surfaces will be painted with a mineral oil, sufficient to prevent the plaster from sticking to the concrete. All cement used will be established brands of high grade Portland cement, which have been in successful use for at least three years, under similar conditions to the work proposed, and also have been seasoned or subjected to aeration for at least 30 days before leaving the mill. The sand used for mortar or concrete will be clean, hard, sharp and coarse, or coarse and fine mixed, free from sewage, mud, clay and all foreign matter. The broken stone used will be of assorted

hooked ends, while all other bars used for reinforcing the concrete will be deformed bars.

A filling of sand, or sand and gravel, will be used for the spaces over the arches, piers, abutment-piers and abutments between spandrel and retaining walls, and a vertical plane along the end faces the abutment retaining walls. This filling will be thoroughly compacted by ramming, rolling saturated with water, or other effective means, and finished to the proper subgrades to receive the pavement or ballast, except that portion of the arch bridge which is to be used as a road by the county, which will not be paved until some time later. The filling over the arch will not be put in until at least one



Typical Roadway Section.

sizes, clean and hard, broken into approximately cubical pieces, and free from long thin scales.

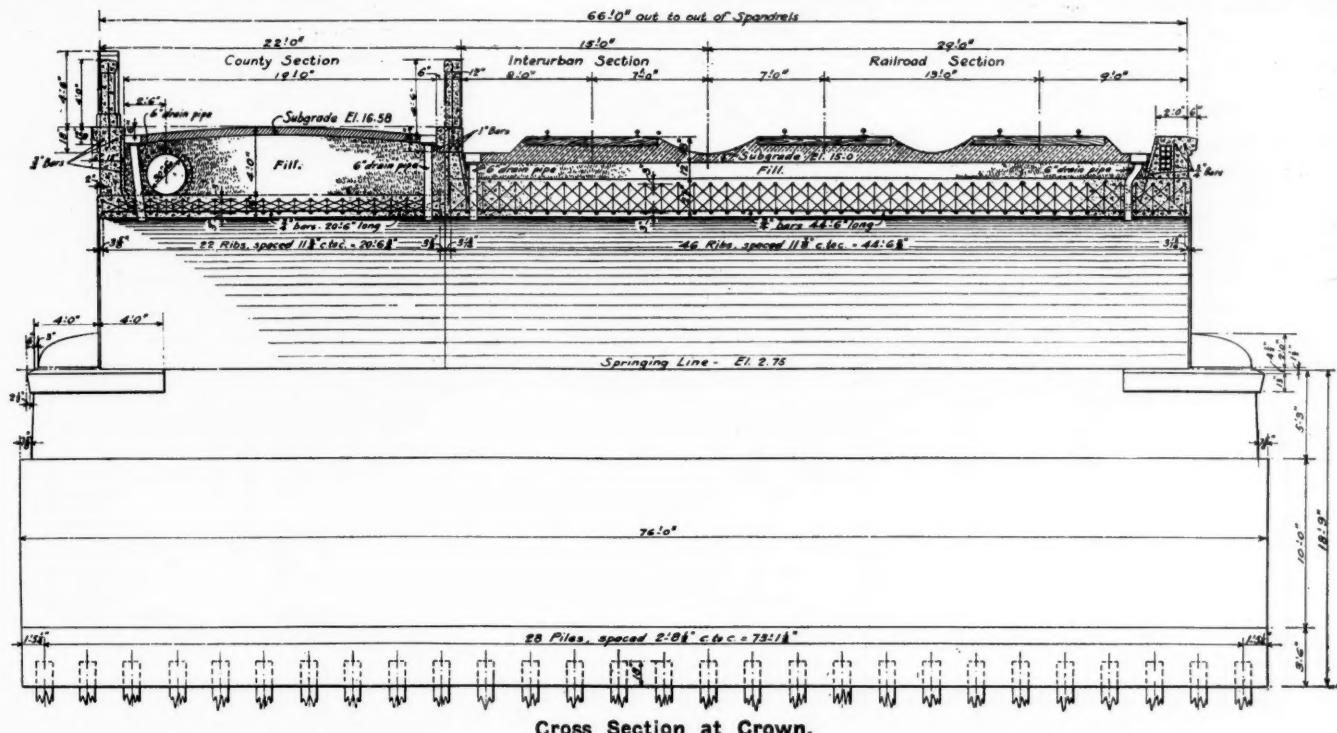
Two grades of concrete are to be used. Grade "a," 1-2-4 mix, in concrete for arches between shewbacks; for the concrete shell one foot thick forming the outside portion of all piers and abutment-pier shafts between pier footings and arches; for a similar shell one foot thick around all abutments where exposed to the sea water; for all copings and cornices; for that part of the southeasterly spandrel walls

week after the arch and spandrel walls have been completed. Provision for draining the fill and for surface drainage shall be made at each pier and at the crown of each arch.

The city of Galveston obtains its water supply from artesian wells, located at Alta Loma, Tex., on the Santa Fe, 18.2 miles from Galveston. The water is carried to the city through a pipe line, which crossed the bay on the county bridge before the storm and has since been placed in the bay. A 30-in. water main, laid along the southwesterly spandrel wall of the arch

bridge, as shown in the illustration, will carry this water supply. At the lift bridge opening, the 30-in. main will drop into the water, cross the opening between the walls of sheet piling, at a depth of 13 ft. 6 in. below mean low water and rise again to the arch bridge on the other side. Two lines of 4-duct, 9-in. multiple vitrified duct conduits, running the full length of the arch bridge, will be laid in the northeasterly spandrel wall.

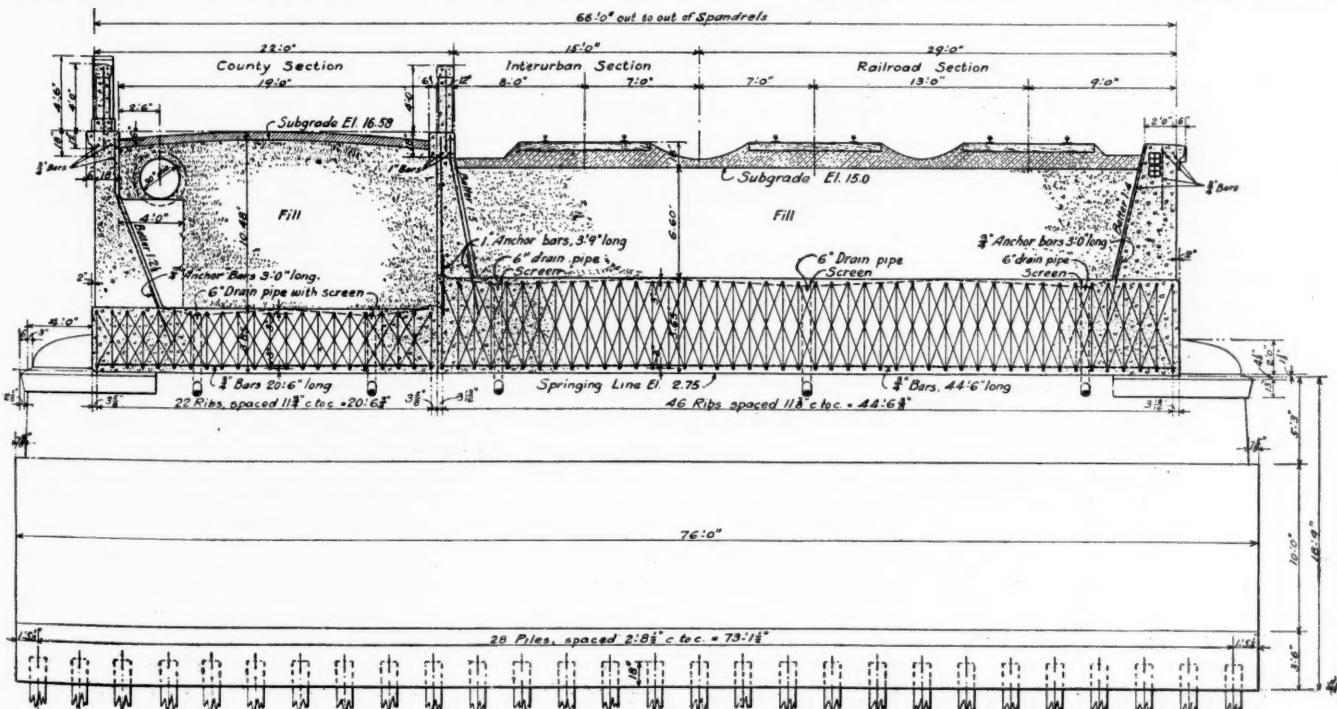
and the unprotected part will be 1,000 ft. long. The reinforced concrete piles used will be made of grade "a" concrete, with the same kind of reinforcing bars as used in the arches. The lower end of each pile, for a length of five ft., will be provided with tongue and groove, and the upper end of each pile will have two grooves on opposite sides. After piles are driven, the grooves of adjacent piles will form a cylindrical open space, which will be filled with mortar, composed of one



Cross Section at Crown.

The roadways will in part be retained by concrete sheet piling, the slopes being protected by the concrete slabs. The remaining part of the roadway will be an embankment of unprotected slopes. The protected part of the roadway on the Galveston Island end of the causeway will be 3,530 ft. long, and the unprotected part will be 1,000 ft. long. The protected part of the roadway on the main land end will be 2,640 ft. long,

part Portland cement and two and one-half parts sand, to form a dowel between adjacent piles, and to calk the joints. The sheet piles will, 24 hours after casting, be kept wet or under water for ten days. All sheet piles will be driven approximately five ft. deep into solid clay bottom. It is expected that 18-ft. piles will be sufficiently long to meet this condition, but if not so longer piles will be used. No piles will be driven be-



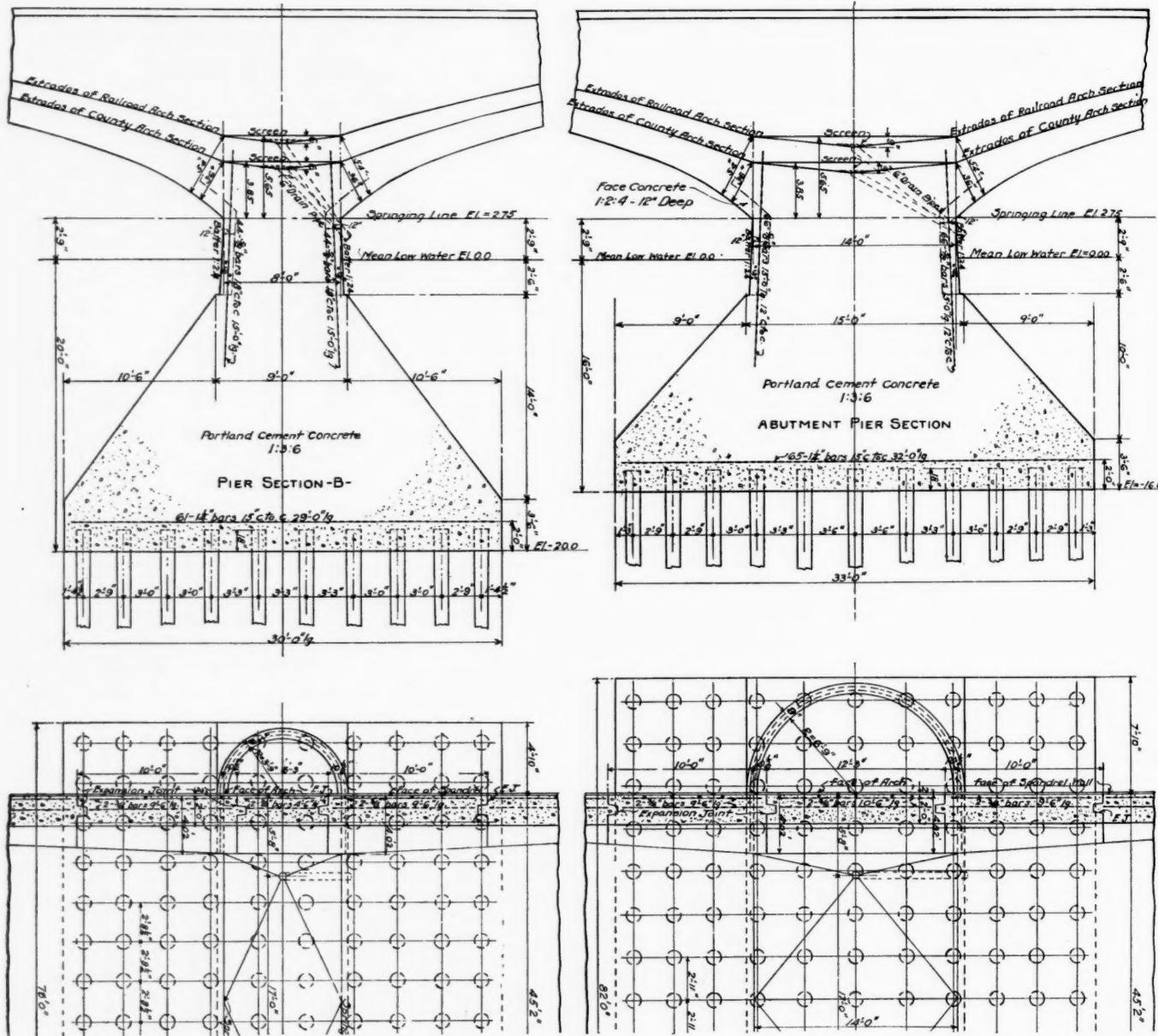
Cross Section at Springing Line.

fore they are two months old and no jetting will be permitted in driving them.

The filling for the roadway will probably consist entirely of sand. If sand in sufficient quantities cannot be secured near the work to make a sand filling feasible, this filling may be made of clay and sand, with the exception of a layer of a few feet of sand. This material will be obtained by dredging from the bay or from borrow pits. No excavation is to be made deeper than one-twentieth of the distance from either the causeway or the present water main which crosses the bay, nor closer than 200 ft. to either. If a mixture of sand and clay has to be used for filling, the sand will constitute at least

be water-borne to its place of deposit, but will be compacted by flooding until no further shrinkage can thus be produced. The filling for the unprotected part of the roadway shall in all respects be similar to that for the protected part, except that it will be allowed to spread to a slope of one vertical to six horizontal.

The slopes of the protected part of the roadway will be covered by concrete slabs, made of grade "b" concrete, cast on the ground. The slopes shall be carefully graded and wet before the concrete is deposited. All joints between slabs will be waterproofed by inserting strips of two-ply tarred felt, and the concrete slabs will not be placed until the filling is settled. The



Part Plans and Elevations of Piers.
Piers Nos. 13 and 14 on left, and Nos. 7 and 20 on right.

30 per cent. of the entire volume. The sand shall be so deposited that it will be fairly uniformly distributed throughout the filling, it being the intention to have the voids between the clay lumps filled with the sand to reduce the shrinkage and its period to a minimum. The filling may thus be carried up to the subgrade of the county road, but for that portion of the roadway which is to be used by the steam and electric railways, clay and sand filling will be carried only to within from two to four ft. below subgrade, and the remaining space to subgrade shall be filled with sand to facilitate surface drainage, as shown on the plans. All material for filling will

slopes of the unprotected part of the roadway above mean low water will be sodded with live Bermuda grass with good roots embedded in the soil or loam, in tufts about three in. in diameter on intersecting diagonals two ft. apart. Soil or loam of such consistency as not to be affected by the wind, will be spread uniformly over the slopes about four in. deep, exclusive of the sodding.

The Concrete-Steel Engineering Company, Park Row Building, New York, are the consulting engineers on this work, to whom we are indebted for the data and blueprints used in connection with this article.

GRAIN HANDLING IN THE UNITED STATES.

BY SAMUEL O. DUNN,

Western Editorial Manager, *Railroad Age Gazette*.

II.

ELEVATOR ALLOWANCES.

The three hearings in the matter of allowances to elevators, which the Interstate Commerce Commission conducted, grew out of a contract between the Union Pacific and the Peavey Grain Company, under which the railway agreed to transfer land at Kansas City and Council Bluffs to the grain company on which to build two large terminal elevators, and to pay 1¼ cents per 100 lbs. on all grain transferred at Kansas City and Council Bluffs from cars on the Union Pacific to cars on other roads. The testimony showed that the Peavey Company had about 500 country elevators in North Dakota, South Dakota, Minnesota, Iowa, Nebraska and Kansas, and large terminal elevators at Council Bluffs, Kansas City, Duluth, Minneapolis and Chicago, and that it handled about 60 per cent. of the grain shipped from stations on the Union Pacific. The object of the Union Pacific in making this contract was to secure the construction of large terminal elevators at Council Bluffs and Kansas City, in which grain could be unloaded from its cars so that they would not have to be sent eastward off its own rails, which would reduce the available equipment on its line when an ample supply of cars was most needed. The allowance was attacked upon the ground that it was a rebate. In its first decision, in 1904, the Commission upheld the entire allowance. In its second decision, in 1907, it upheld the legality of giving an allowance, but reduced it to 1 cent. In its third decision, in 1908, it held that conditions had so changed that any allowance by the railway to the Peavey Company in its capacity as an elevator company amounted to a rebate to it in its capacity as a grain dealer, and therefore gave it an unfair advantage over its competitors.

For competitive reasons, other roads had granted similar allowances to other concerns or had given them what were regarded as equivalent reductions in freight rates. The Commission's last decision held in effect that all such arrangements were illegal under the Hepburn act.

A good example of the relations existing between the railways and the elevator companies doing business on their lines was afforded by the testimony regarding an arrangement between the Chicago, Rock Island & Pacific and the South Chicago Elevator Company at South Chicago, Ill. It was shown that J. C. Shaffer, a Chicago grain merchant, had bought two large terminal elevators at South Chicago from the Counselman estate for \$700,000, and had soon afterwards sold them to the Chicago & Rock Island Elevator Company, which, it is assumed, represented the Rock Island railway, for \$1,000,000. They were then leased to the South Chicago Elevator Company, in which Mr. Shaffer is the controlling factor. Under the conditions of the lease the South Chicago Elevator Company was to get the use of the elevators for practically nothing if it handled a specified very large amount of grain over the lines of the Rock Island annually. If it failed to ship the required amount of grain over this road it was to pay a rental which grew rapidly higher in proportion as the amount of the traffic grew smaller. It was shown also that the Rock Island had made an arrangement with the Rosenbaum Grain Company under which this company was to build a large terminal elevator at Kansas City. When the elevator was finished the road was to pay for it what it cost with \$5,000 additional as compensation for the service rendered in erecting it. This \$5,000 compensation was to take the form of a deduction of 15 per cent. from the freight charges accruing on the Rosenbaum Company's grain until the obligation had been satisfied. The contract also provided for an allowance of 1¼ cents per 100 lbs. to the grain company for elevating and transferring its

own grain, but provided that this clause would be waived if the allowance was found illegal by the Interstate Commerce Commission. The traffic officers of the Rock Island stated that, as the contract indicated, it was made to put the Rosenbaum Grain Company on an equal footing with the Peavey Company at Kansas City, in order that the Rock Island might be able to meet the competition of the Union Pacific for grain traffic.

These contracts are not cited as exceptional but as illustrative of arrangements into which many railways have entered with numerous grain concerns. In every case the object of the road evidently was not to discriminate in favor of any particular shipper or dealer, but to get for itself the largest grain traffic possible, and to reduce to a minimum the delays to its equipment, especially in busy seasons.

DEVELOPMENT OF ELEVATOR SYSTEM.

How greatly the various conditions and arrangements referred to have stimulated the development of the elevator system is indicated by the magnitude which it has attained. At 25 large terminal markets or exporting points in the United States there are 428 elevators with an aggregate capacity of 260,541,000 bushels. These points, with the number of elevators they have and their capacity in bushels, are as follows:

	No. of elevators.	Capacity, in bush.
Chicago	87	58,945,000
Minneapolis	48	40,890,000
Duluth	23	30,175,000
Buffalo	28	24,190,000
Milwaukee	21	13,960,000
New York	18	13,230,000
St. Louis	39	12,080,000
Kansas City	38	11,290,000
Toledo	10	6,250,000
Omaha	15	6,040,000
New Orleans	9	5,180,000
Baltimore	5	5,100,000
Detroit	14	4,540,000
Montreal	10	4,150,000
Galveston	4	3,800,000
Philadelphia	4	3,100,000
Louisville	7	3,000,000
Newport News	2	2,550,000
Boston	4	2,200,000
Cincinnati	12	2,010,000
Indianapolis	9	1,955,000
Cleveland	6	1,916,000
Nashville	5	1,700,000
Seattle	2	1,550,000
Evansville	8	740,000

The corn crop of the United States in 1908 was 2,668,651,000 bushels; the oat crop, 807,156,000 bushels, and the wheat crop, 664,602,000 bushels. The terminal elevators at the centers referred to have, therefore, a storage capacity equal to considerably more than one-third of the total wheat crop, or to almost one-third of the total oats crop, or to one-tenth of the total corn crop. And of course this takes no account of the thousands of country elevators, one of which is to be found at almost every country station of any importance, and of which there sometimes are as many as eight or even 12 at an important station in the grain belt. If the storage capacity of all the country elevators were added to the storage capacity of all the terminal elevators, it would be found that together they would hold a very substantial part of the total annual grain crop.

The number of terminal elevators that is now both owned and operated by the railways themselves is relatively small. The Chicago, Milwaukee & St. Paul operates one at Minneapolis; the Santa Fe one at Chicago; the Lake Shore one at Toledo; the Boston & Maine and the New Haven one each at Boston; the Baltimore & Ohio two at Baltimore; the Northern Central one at Baltimore, and the New York Central one, the West Shore two, and the Pennsylvania Railroad one at New York City. The number operated by companies which the railways control is substantially larger, but a large majority of the total is run by private concerns.

The terminal elevators at most points are divided into two classes—public and private. The private elevators handle only grain bought and sold by their proprietors, and are equipped with machinery for grading, blending, etc. Public elevators transfer and store grain for everybody who tenders it, and the

owners are not allowed to handle grain belonging to themselves. They have no machinery for treating the commodity, and are required always to keep the same grade in the same bins. Of the 87 elevators at Chicago, 13, having a capacity of 22,500,000 bushels, are public, and the rest, with a capacity of 36,445,000 bushels, are private. The storage rate at Chicago is three-quarters of 1 cent per bushel per day for the first 10 days and $\frac{1}{40}$ of a cent for each additional day.

FARMERS' ELEVATORS.

Up to ten years ago practically all of the grain handled in bulk in the United States was sold by the farmer to dealers and shipped by them to the large central markets. In recent years there have been built at country stations numerous so-called "farmers' elevators," which are owned by corporations, the stock of which belongs to the farmers in the surrounding country. In numerous cases these elevators have proven unprofitable. In others, it is said, they have yielded their owners good returns. It was formerly complained that the railways discriminated in the furnishing of cars in favor of the so-called "regular" elevators and against the farmers' elevators. There has been no such complaint since the fall of 1907, as since then the railways have been able to furnish plenty of cars to everybody who has applied for them.

GRAIN HANDLING IN SACKS.

While the system of handling grain in bulk through elevators has become almost the only method used in the Middle West, the system of handling it in sacks has grown up and is still the prevalent method in the extreme Northwest. There the farmer sacks his grain in the field when it is threshed, and it is hauled in sacks to a flat warehouse at the country station instead of to an elevator. It is also hauled in sacks by rail, and when it reaches the large markets on the Pacific seaboard, it is put into large flat warehouses in sacks. Some of these warehouses have a capacity of as much as 2,000,000 bushels.

Before the Northern Pacific was built to Puget sound all grain docks in the Northwest and the ground occupied by them were private property. When the Northern Pacific reached Tacoma its officers considered it necessary, in order that it might get its share of the grain business, to build its own warehouses, and it did so and leased them to private firms that were in a position to give it traffic. Competition between the Northern Pacific at Tacoma and the Oregon Railroad & Navigation Company at Portland caused the latter to lease water front property belonging to it at Portland to large grain concerns. Competition compelled the Great Northern to make similar terms with concerns at Seattle and Everett. No grain warehouses have been built in Portland or on Puget sound with private capital since the railways thus interested themselves in the business, although a number that were there before are still there and in operation.

There has been a prolonged controversy in the Northwest over the question of whether or not the introduction of bulk shipments into that territory would be to the advantage of all concerned. About a year ago W. H. Reed, of Tacoma, Wash., a member of the Washington State Grain Commission, wrote an open letter in which he presented the case in favor of the adoption of bulk shipments. He argued that the cost of shipping wheat in bulk from the threshing machine to Liverpool would be less than is the cost of shipping it in sacks and that in the long run the farmer, if bulk shipment were adopted, would gain the difference in cost. At the threshing machine in sacking there is a "sack jigger" who is paid \$3 a day and two sack sewers who are paid \$4.50 each per day, making \$12 a day. If 2,300 bushels be threshed in a day, the wages of these men aggregate $\frac{1}{2}$ cent per bushel. This expense, Mr. Reed pointed out, would be avoided if the wheat were run from the thresher spout into a galvanized iron or steel tank or bin at each sifting. The farmer could then store his crop on his place until he got ready to sell. He would have no insurance to pay on the grain because it could not

burn in the tanks and there would be no possibility of damage to it by stock getting into the field and tearing the sacks. The field could be used for feeding stock as soon as the thresher pulled out. There would be no damage by rain before hauling, which could be done at any time when teams and men were not required for other work. By handling the grain in this way, he contended, the farmer would save $1\frac{1}{2}$ cents a bushel. He could mix his grain in his own bins and profit an additional cent and a half a bushel on that which was light weight. It would cost him less to load his wagons with bulk than with sack grain and a wagon load of bulk grain could be dumped and weighed at the elevator in five minutes, whereas to unload sack grain requires a great deal more time.

The aggregate saving up to this point would be $3\frac{1}{2}$ cents a bushel. The farmer gets at the station 3 cents a bushel more for his wheat in sacks than in bulk and his sack costs him a little more than 3 cents a bushel; so it seems possible, Mr. Reed argued, for him to handle the grain to the station about $3\frac{1}{2}$ cents a bushel cheaper in bulk than in sacks. Mr. Reed also said that the loading of a 1,000-bushel car of sacked grain at the country warehouse takes two men two hours, while it can be loaded in bulk by one man in five minutes. The railway freight on bulk grain is the same as on sacked grain; in other words, the transportation of the sack has to be paid for at the same rate as the transportation of the grain. At tidewater it takes 12 men, including the weigher, one hour to unload and pile a car of 1,000 bushels in sacks. In bulk three men can sweep out a car, unload the grain and bin it in from 5 to 10 minutes. It takes 15 men four and a half days of eight hours each to load a vessel with 125,000 bushels of sacked grain. In bulk the same quantity of grain can be loaded in three or four hours by one-half as many men. Mr. Reed contended that all of the extra expenses involved in the handling of grain in sacks—including the freight that must be paid on the sacks—must ultimately come out of the pocket of the farmer, who, because of these extra expenses, gets a lower price for his crop than he would if it were shipped in bulk. He said that the real reason why the grain merchants on the Pacific coast continue to argue in favor of the continued handling of wheat in sacks is that they know that the introduction of the bulk system would destroy the value of their large warehouses. He predicted that the Chicago, Milwaukee & St. Paul and other new roads that are building into Washington would build elevators on their lines and force the exporters to handle grain in bulk.

GRAIN FOR EXPORT.

While some railway officers who have investigated the subject regard the argument in favor of bulk handling as conclusive, others think that there is much to be said in favor of handling in sacks. The main reason, undoubtedly, why the system of handling in sacks has held its own is that a very large proportion of the grain grown in the Northwest is exported to Europe and Asia. The amount exported fluctuates greatly from year to year according to the size of the yield, the Oriental market for grain and the proportion of the total crop absorbed by the flour mills, and the proportion taken by the flour mills depends upon the condition of the export flour trade, particularly to the Orient. Six years ago it was believed that the export shipments of wheat from the Northwest would soon become unimportant and that the entire part of the crop exported would be converted into flour before leaving North Pacific ports. But these expectations were disappointed. There was a large increase in the production of wheat in Manchuria and a heavy decline in the flour trade to China. Japan adopted a tariff to protect Japanese millers. Large additions were made to the Russian and Japanese milling capacity. The consequence in 1907 was a large increase of export shipments of wheat as compared with export shipments of flour. The indications are that plans for the future handling of the crop of Washington, Oregon

and Idaho should provide for the probable exportation of 50 per cent. of the surplus crop in the form of wheat.

Now, the wheat exporters on the coast do not favor bulk shipments by sea or bulk handling of wheat from the country railway stations to terminals. Grain making the long voyage from the North Pacific coast to Europe must cross the equator twice, and it is claimed that when shipped in bulk it will heat and reach Liverpool in bad condition. In answer to this, it is stated on good authority that there has been no actual trial of bulk wheat shipments from the Pacific coast to Europe via Cape Horn. The Northern Pacific Elevator Company made a partial experiment 20 years ago when it loaded 10 sailing ships, but only one-third of the cargo was in bulk owing to rules of the underwriters. The advocates of bulk shipments contend that steamships could carry bulk wheat and get it to Europe in good condition if it were perfectly dry when loaded, and that the underwriters would, under proper conditions, modify their rules so as to permit such shipments.

Another objection to bulk shipments is that so many varieties of wheat are grown in the Northwest—eight distinct varieties being produced in eastern Washington alone—that it is impossible to make a full cargo of any one kind. This objection could be overcome only by reducing through some means the number of kinds grown. It is claimed that Pacific coast smut is much worse than eastern smut, and that smut balls are easily broken in bulk handling and cannot be blown out in the original cleaning process on farms or at country stations. The farmer, however, can get rid of it if he will use chemicals prescribed by experts.

The exporters claim that the necessary investment in elevators both at country stations and terminal points is so much greater than in the flat warehouses that they could not successfully compete with the flat warehouses unless the railways charged a higher freight rate on sacked wheat, in which event the net return to the farmer would be decreased. The farmer, it is argued, pays from 6 to 10 cents for a sack that will hold two bushels of grain. He can get 2½ to 3 cents per bushel more for wheat in sacks at country stations than for wheat in bulk. Consequently, he pays not more than 2½ cents per bushel for the use of a sack and often less. It is claimed that in order to save this he could not afford to provide necessary facilities for bulk handling and pay the higher storage charges to which bulk wheat stored at country stations would be subject.

BULK SHIPMENT VERSUS SACK SHIPMENT.

The average crop of wheat of a farmer in the Pacific Northwest is 10,000 bushels; tank wagons, capacity 100 bushels, cost \$20 each; a granary with a capacity of 10,000 bushels, about \$250. The investment for bulk handling on the farm is, therefore, not large. But scarcity of labor and teams in harvest time prevent the same saving in cost that is made by eastern farmers who haul directly from the threshing machine to the receiving elevator. It is estimated by defenders of shipment in sacks that it would cost a Washington farmer 1 or 2 cents a bushel more to put wheat in his granary, later haul it to the station, etc., than to sack it, pile it in the threshing field, protected from stock by a temporary fence and by straw from the weather, and leave it there until it is convenient to haul it.

Country storage rates in the far Northwest are now 50 cents per ton to January 1 and 10 cents per ton per month thereafter. The storage rates of elevators in Minnesota and the Dakotas are 1 cent per bushel per month for the first three months and one-half a cent per bushel per month thereafter. On account of bad winter roads wheat must be hauled in a large part of the Northwest before December 1 or after April 1, and therefore the need for large storage facilities at country stations is greater than in the more easterly states, and the higher storage rate on bulk grain would be felt more in the Northwest than farther east.

One of the strongest objections urged against bulk shipments is that they would endanger the boats in which they were exported. It is said that even under the present system of stowing grain in sacks and securing it by boards to prevent it from shifting to one side of the boat in a heavy sea in a manner impossible with bulk grain, no season passes without some of the grain fleet being damaged or lost through the shifting of the cargo in the heavy seas met in the vicinity of Cape Horn. It is argued that the seas encountered by ships carrying grain from the Pacific coast to Europe are so much heavier than any encountered by vessels carrying grain in bulk from the Atlantic coast to Europe that it cannot be assumed, because bulk shipments from the Atlantic seaboard are successful, that such shipments from the Pacific coast are feasible. *

From the railway standpoint, the handling of grain in sacks has one great advantage. Bulk grain must be handled in box cars, while all kinds of freight cars are available for sack shipments. The railways in the Northwest have sometimes hauled as much as 30 per cent. of the entire crop in flat cars and stock cars. As many of the flat cars that are used to haul lumber shipments eastward might but for the sack grain shipments have to go westward empty, the claims against the railways for damage to grain hauled in open cars are usually small, it is said, compared with the saving in cost of operation.

Owing to the comparatively low rates of storage in the Northwest and the fact that the farmers are uncommonly prosperous and have a tendency to speculate with their wheat the proportion of sales immediately after harvest is less than in states farther east. In consequence, the movement of the grain to market after harvest is much less rapid than in such states as Minnesota, the Dakotas and Kansas. The result is that the railways in the Northwest find that the congestion of traffic caused by the movement of grain on the western part of their lines is usually less in the fall than on the eastern part. They have, in consequence, been able, as already indicated, to a large extent to adjust the westward movement of grain to the westward movement of otherwise empty cars for lumber.

The arguments of those who contend that handling grain in sacks is best adapted to the conditions and needs of the Northwest have thus far been sustained by the logic of experience. The number of elevators in that section has increased substantially within recent years. The late F. H. Peavey some years ago built numerous fine elevators at important wheat shipping points in Oregon and Washington on the Harriman Lines. The number of elevators on the Northern Pacific west of Spokane is gradually increasing, having grown from four in 1902, with a capacity of 190,000 bushels, to 17 in 1907, with a capacity of 667,000 bushels. In 1906 and 1907 the Farmers' Grain & Supply Company, a co-operative concern, built several elevators on this road. But it seems that no great progress has been made in getting farmers to adopt bulk shipments. During the season of 1906 one elevator concern built a number of wagon tanks, the use of which it furnished free to the farmers. It also paid them for bulk grain within 2½ cents per bushel as much as they could get for sacked grain. In this way it succeeded in getting a considerable quantity of bulk grain. But the next season the farmers went back to sacks. Even the concerns that handle large quantities of grain through elevators receive a large proportion of it in sacks.

The 40 to 50 elevators at points on the Oregon Railroad & Navigation Company which were built by F. H. Peavey & Company, and which are now owned by the Pacific Coast Elevator Company, are, it is said, being operated satisfactorily both to their owner and to the railway on whose lines they are. It seems to be the judgment of experts that ultimately grain will be handled in bulk to Pacific coast terminals as it is to other large terminal points, but this will involve such a

complete revolution in the methods of farmers and grain merchants that if it is ever brought about it will be accomplished gradually.

PACKAGE CAR SERVICE FROM ST. LOUIS.

The Freight Bureau of the Businessmen's League of St. Louis is issuing the third edition of its pamphlet showing exact details of the package car service from St. Louis, as a center. The accompanying map is intended to show approximately the number of days required to make delivery of merchandise shipments from St. Louis to the principal points within the zone described.

At the present time 674 package cars leave St. Louis daily, with less than carload shipments, sealed to distant break-bulk points, and handled in through fast trains. Eighty-five per cent. of these cars are handled on schedule time. The railways, recognizing the earnest spirit of co-operation mani-

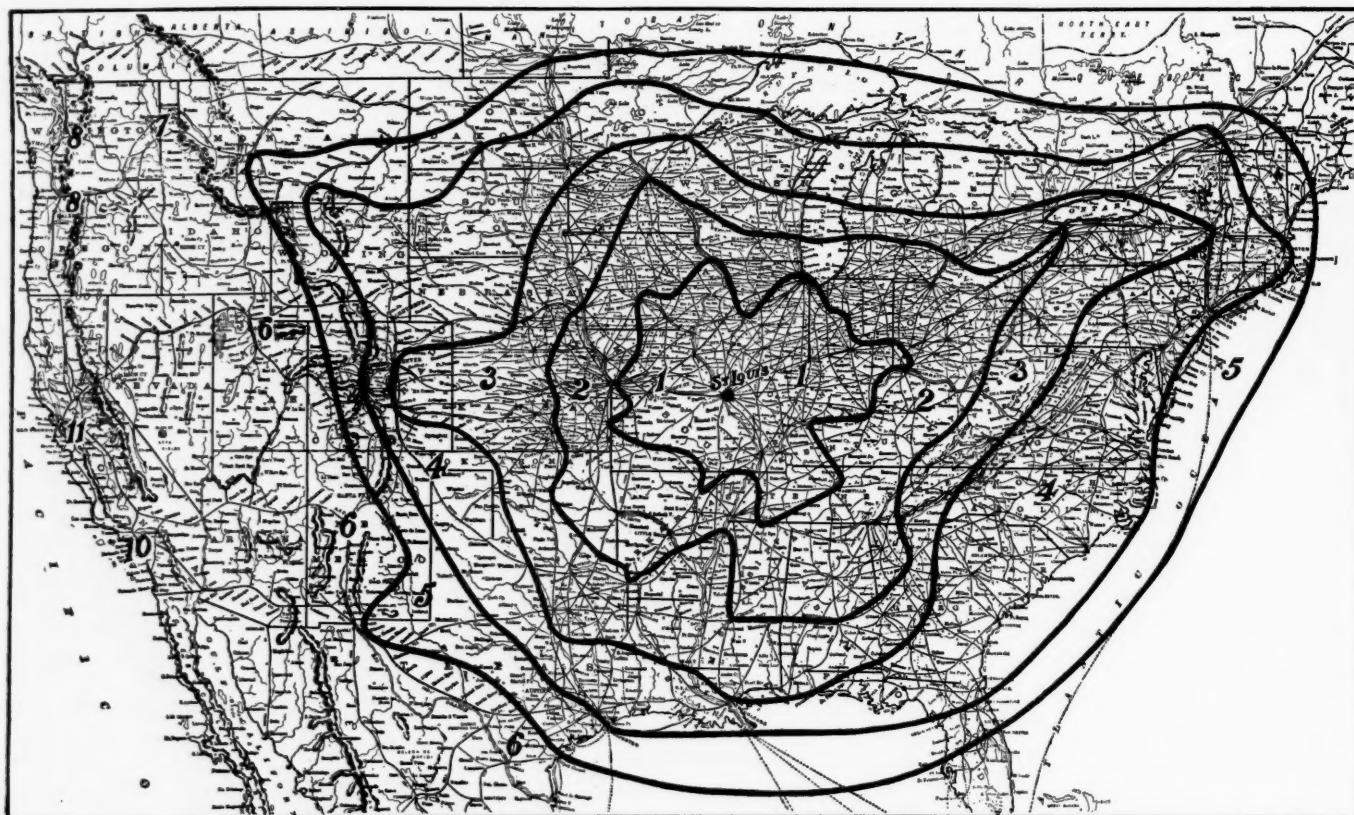
Lübeck by way of Bremen and Hamburg. The fourth line is from Berlin to Königsberg by way of Stettin and Danzig. The fifth line is from Strassburg to Berlin by way of Metz, Trier, Mayence, Frankfurt, Erfurt, Leipzig, Halle and Magdeburg.

RAILWAY RATE MAKING IN PRACTICE.

BY WILLIAM Z. RIPLEY,
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CHAPTER IV.—Continued.

Another interesting example of the difficulty of bringing about a change in rate adjustment is afforded in the trans-continental field. For some years a general agreement seems to have been adopted as a sort of a compromise between the various conflicting interests. Under present conditions



Days Required for Delivery; Package Car Service from St. Louis.

fested by the Businessmen's League, furnish the League with monthly statements showing in detail the actual movements of these package cars. They are constituting an increasingly important part of the transportation system of the country.

Consul T. J. Albert, of Brunswick, in reporting that the German Aerial Navigation Co., Frankfort-on-Main, has established the first permanent airship lines in Germany, gives the following details: It is the purpose of the company at the start to connect fully 20 cities. It has already received patents for its turn halls for motor balloons, and it will erect the first halls in Berlin, Munich and Strassburg in Alsace. The extensive plans of the company have aroused the liveliest interest on all sides, and their execution appears to be financially assured. The first line of connection planned is Munich to Dresden by way of Nuremberg, Plauen and Chemnitz. The second line is from Munich to Cassel by way of Ulm, Stuttgart, Mannheim, Mayence, Coblenz, Cologne, Düsseldorf, Elberfeld and Paderborn. The third line is from Berlin to

Chicago and all points east of the Mississippi from Maine to Florida enjoy precisely the same rate to the Pacific coast.* Chicago has at various times contended before the Interstate Commerce Commission for graded rates which should recognize, for instance, that being 1,200 miles nearer San Francisco than Boston on the basis of distance it should have proportionately lower freight rates. Apparently some of the transcontinental roads, such as the Great Northern, have been willing to make this concession. They could not, however, take any action without first obtaining the consent of every railway and steamship company with which they compete. Inasmuch as almost every railway in the country participates in transcontinental business, an agreement was practically impossible. Entirely aside from the merits of this particular intricate question, it must be borne in mind that there is no such thing as independence of action on behalf of any single carrier. It becomes exceedingly easy for one road to play a dog-in-the-manger part. The shipper may be subjected to an extortionate

*This is described in Ripley, *Railway Problems*, pp. 405-441.

policy, not dictated by the road over which he ships, as a matter of fact, but by roads operating perhaps a thousand or more miles away.

Praiseworthy as is the elasticity of railway rates in the United States, there is nevertheless much to be said in support of the contention that at times this has been carried to an extreme. Stability and certainty have been treated as of secondary importance. Particular shippers have been aided, but the general interests of trade have suffered some injurious consequences. It is not entirely clear whether the advantage gained from elasticity has at all times been worth the cost. Certain of the disadvantages of instability of rates seem to have been overlooked.

In the first place railway tariffs have in the past undoubtedly been too voluminous and complex. The number of these filed with the Interstate Commerce Commission is extremely large. Eleven railways alone during the year to November 30, 1904, filed 30,125. The total schedules of all American railways filed during the year to November 30, 1907, was 220,982. One single carrier had 15,700 tariffs in force at the same time. The New York Central & Hudson River in December, 1899, had no less than 1,370 special commodity rates in force. There were endless contradictions and conflicts. Secret rates were hidden in devious ways in this mass of publications. Special tariffs "expiring with this shipment"; rates quoted not numerically but by numbered reference to tariffs of other carriers and applicable by different routes; agreements to meet rates of any competing carriers, were among the irregular methods of concealment adopted. Although literally complying with the law by publicly filing all tariffs, conditions were often such that not even an expert in rates could discover in this maze of conflicting evidence what the rate at any time actually was. The door was opened wide to personal discrimination and abuses of all kinds. Those conditions are not necessary. They do not obtain on the best roads in other parts of the world. Nor is such instability found in respect of some important lines of trade. No agricultural product fluctuates in price more abruptly or widely than raw cotton,—from five to seventeen cents a pound. Yet the rates on that commodity have remained quite undisturbed throughout the southern states for many years.

The second disadvantage of too great elasticity in freight rates is that it may at times promote rather than lessen that state of economic unrest inevitable in all business, especially in a new country. Under a continual disturbance of rates, the merchant is unable with security to enter into long-time contracts. Rates are sometimes changed, not to suit the shipper but to serve the railway's interests. Sometimes traffic may be diverted from its natural channels. The spirit of initiative and self-reliance on the part of shippers may be undermined. Persistent titillation of competition may be pleasant for a time, but its final results may be injurious. Constant appeal to the traffic manager of his road for aid and comfort may quite naturally divert the shipper's attention from an aggressive commercial policy which would render him independent of minor changes in freight rates. The more responsibility the traffic manager assumes the more may be put upon him. And it must always be remembered that each move by one road to protect a client will probably be checkmated by the tactics of rival lines. Economic peace, not warfare, should be encouraged by the services of common carriers. One of the positive advantages of governmental regulation of railway rates is that it contributes to stability. That this view is shared by experienced railway men appears from the following testimony of President Mellen of the New Haven road.* "I think that great trouble comes to the business of this country through the fact of these little breaks in rates. During November two new railways were opened into the city of Denver. They sought to make themselves popular by lowering rates, and rates went

down very low. They went down legally, but they went down very low. Just before the rates went down the merchants of the city had stocked Denver with goods and the lowering of the rates demoralized their prices; they lost a large amount of money and dissatisfaction was caused from Chicago to Denver. Lowering of rates demoralized business generally. I think if those roads had known that the rates which they made had to remain in force thirty days they would have hesitated before they lowered them. I would increase the time required before rates could be reduced."

The foregoing consideration suggests still another argument in favor of stability of freight rates even at the expense of a certain amount of flexibility. Special rates which create new business should be carefully distinguished from special rates which merely wrest business from other carriers or markets. Any expedient which will make two blades of grass grow where one grew before; which puts American wheat into Liverpool in competition with India and Argentina; which cheapens California fruit on the eastern markets; which offers a wider choice of building stone for Chicago; which will establish new industries for the utilization of local raw materials, deserves the greatest encouragement. Our country has been unprecedently developed in consequence of the energy and progressiveness of its railway managers. But thousands of other special rates have no such justification, even where they are public and open to all shippers alike. These are the expression of railway ambition to build up trade by invading territory naturally tributary to other railways or traders. A significant feature of commercial competition is the utilization of distant markets as available "dumping grounds" for the surplus products left over from the local or natural market. In the St. Louis Business Men's League case* the Pacific coast jobbers complained that the large distributing houses in the middle west thus invaded their territory. Having met their fixed charges from their own natural territory, they invaded the remotest districts by cutting prices to the level of actual production cost per unit of new business. The Florida orange growers' protest against the relatively lower rate on California fruit, which is carried twice the distance for less money per box. This, it is urged, enables the western grower, having glutted his natural market in the middle west, to "dump" his surplus into the eastern field to which alone the Florida orange is restricted. This line of argument is the same as that which upholds the systems under which lower rates are given for exported or imported commodities than those on goods for domestic consumption. It is always alleged that such sales at long reach actually benefit the consumer or producer near at hand, inasmuch as they contribute something toward the fixed expenses of the business, which must be borne in any event. This raises at once the much broader question as to what constitutes a "natural market" or the "natural territory" which rightfully belongs to any given economic agent. It is, however, too extended an issue to be discussed at this time.

Too many special commodity rates, intended to meet the needs of particular shippers instead of increasing new business, may merely bring about economic waste through exchange between widely separated markets or by causing an invasion of fields naturally tributary to other centers.† Whenever a community producing a surplus of a given commodity supplies itself, nevertheless, with that same commodity from a distant market economic loss results. Numerous instances could be cited where identical products are redistributed after a long carriage to and from a distant point in the very area of original production. Dried fruits may be distributed by wholesale grocers at Chicago in the great fruit-raising regions of the West and South. Cotton goods made by southern mills may be shipped to New York or Chicago, and then sent back again for final distribution with the addition of a middleman's commission and a double freight rate. The Colorado Fuel &

*Senate Committee on the Transportation Interests of the United States and Canada, 1890, p. 362.

†Ripley, *Railway Problems*, pp. 405, 441.

‡Discussed in detail in Ripley, *Railway Problems*, p. 496.

Iron Company seeks special rates in order to sell goods over in Pittsburgh territory; while its great competitor, the United States Steel Corporation, has an equal ambition for the trade of the Pacific Slope. In another case it appeared that a sash and blind manufacturer in Detroit was seeking to extend his market in New England. Manufacturers of the same goods in Vermont were simultaneously marketing their product in Michigan. The Detroit producer did not complain of this invasion of his home territory, but objected to the freight rate from Boston to Detroit, which, probably because of back loading, was only about one-half the rate on his own goods from Detroit to the seaboard. Is not this an economic anomaly? Two producers, presumably of equal efficiency, are each invading the territory naturally tributary to the other and are enabled to do so by reason of the railway policy of "keeping everyone in business." The New England railways are compelled by reason of the remoteness to their territory to defend this policy. As President Tuttle, of the Boston & Maine, expresses it, "I should be just as much interested in the stimulating of Chicago manufacturers in sending their products into New England to sell as I would be in sending those from New England into Chicago to sell. It is the business of the railways centering in Chicago to send the products from Chicago in every direction. It is our particular business in New England to send New England products all over the country. The more they scatter the better it is for the railways. The railway does not discriminate against shipments because they are east-bound or west-bound. We are glad to see the same things come from Chicago into New England that are manufactured and sent from New England into Chicago." No one questions for a moment that the widening of the sphere of competition by transportation agencies is a service of incalculable benefit to the country. But it should also be borne in mind that superfluous transportation is economic waste. The industrial combinations in seeking to effect a strategic location of their factories in order to divide the field have apparently come to a full recognition of this fact.

A fourth objection to undue development of special commodity rates is that they may entail increased burdens upon the local constituency of each railway. The proportion of such special rates is 50 per cent. greater in America than in the United Kingdom. It is plain that each shipment which fails to bear its due proportion of fixed charges, even though contributing something thereto, leaves the weight of interest and maintenance charges upon the shoulders of the local shipper. To be sure, those special rates which permanently create new business operate otherwise. But in the vast complex, each railway often wrests from competing carriers only about as much tonnage as it loses. It invades rival territory, but its own constituency is invaded in retaliation. Thus there is rolled up an inordinately large proportion of such special traffic, leaving the regular shipments and the local trade to bear the brunt of fixed charges. Momentous social consequences may result. Not only the cost of doing business, but the expense of living in the smaller places is increased. One of the most dangerous social tendencies at the present time is the enormous concentration of population and wealth in great cities. Increased efficiency and economy in production are much to be desired; but social and political stability must not be sacrificed thereto. Is it not possible that a powerful decentralizing influence may be exerted by checking this indiscriminate and often wasteful long-distance competition, through greater insistence upon the rights of geographical location?

Finally an abnormal disregard of distance, which is always possible in the making of special rates to meet particular cases, may bring about a certain inelasticity of industrial conditions. This may occur in either one of two ways. The rise of new industries may be hindered; or the well-merited relative decline of old ones under a process of natural selection may be postponed or averted. The difficult problem of fairly adjusting rates on raw materials to finished products in order that the

growth of new industries may take place, while at the same time the old established ones shall not be cramped or restricted, has already been discussed. It is equally plain that at times there may be danger of perpetuating an industry in a district, regardless of the physical disabilities under which it is conducted. One cannot for a moment doubt the advantages of a protective policy on the part of railways; safe-guarding industry against violent dislocating shocks. An inevitable transition to new and perhaps better conditions may perhaps be rendered easier to bear. To New England, constantly exposed to the completion of new industries rising in the West, this policy has been of inestimable value. On the other hand, it is incontestable that in the long run the whole country will fare best when each industry is prosecuted in the most favored location, conditions of marketing as well as of mere production being always considered. If Pittsburg is the natural centre for iron and steel production, it may not be an unmixed advantage to the country at large, however great its value to New England, to have the carriers perpetuate the barbed wire manufacturer at Worcester. If California can raise a finer or more marketable variety of orange, and at a lower cost, than Florida, it would be a backward step to counteract the natural advantage of the western field by compelling the southern railways to reduce their rates to an amount equal to the disability under which the Florida grower works. The principle laid down by the so-called "Bogue differentials" in the lumber trade* bears upon this point. In order to equalize conditions between a large number of lumbering centres sending their products to a common market, certain differentials between them were allowed under arbitration, "to enable each line to place its fair proportion of lumber in the territory." Did this mean that the disability of any place in manufacturing cost shall be compensated by a corresponding reduction in the ensuing transportation cost? This was the view of some of the carriers who were zealous to keep the market open to all on equal terms. Yet it is evident that, carried beyond a certain point, such a policy would not only nullify all advantages of geographical location, but it would also reverse the process of natural selection and of survival of the fittest, upon which all industrial progress must ultimately depend. Each particular case, however, must be decided on its merits. Our purpose is not to pass judgment on any one, but merely to call attention to the possible effect of such practices upon the process of industrial development.

Centralization, or concentration of population, industry and wealth is characteristic of all progressive peoples at the present time. Great economic advantages, through division of labor and cheapened production, have resulted; but on the other hand, manifold evils have followed in its train. Sometimes it appears as if American railway practices in granting commodity and flat long-distance rates so freely, operated in some ways to retard this tendency. But the influence is not all in that direction. Many staple industries, utilizing the raw material at their doors, might supply the needs of their several local constituencies were it not that their rise is prevented by long-distance rates from remote but larger centers of production. Denver, in striving to establish paper mills to utilize its own Colorado wood pulp, is threatened by the low rates from Wisconsin centers. Each locality ambitious to become self-supporting is hindered by the persistency of competition from far away cities. This is particularly true of distributive business. The overweening ambition of the great cities to monopolize the jobbing trade, regardless of distance, has already been discussed. And it follows, of course, that the larger the city the more forcibly may it press its demands upon the carriers for low rates to the most remote hamlets. The files of the Interstate Commerce Commission are stocked with examples of this kind. The plea of the smaller cities and the agricultural states—Iowa for example—for a right to share in the distributive trade naturally tributary

*Ripley, *Railway Problems*, pp. 209 and 219.

to them by reason of their location, formed no inconsiderable element in the recent popular demand for legislation by the Federal government.

The marked difference between competition in transportation and trade has long been recognized in economic writing, but has not as yet been accorded due weight in law. The most essential difference arises from the fact already fully set forth, that a large proportion of railway expenditures are entirely independent of the amount of business done. This involves as a consequence the exemption of carriers from the fundamental law of evolution. Survival of the fittest does not obtain as a rule in railway competition. The poorest equipped, the most circuitous and most nearly insolvent road is often able to dictate terms to the standard and most direct trunk lines. This has been exemplified time and again in the history of rate wars the world over. The bankrupt road having repudiated its fixed charges has nothing to lose by carrying business at any figure which will pay the mere cost of haulage. The indirect line having no business at the outset has nothing to lose, and everything to gain. The Canadian Pacific, for example, was perhaps originally built without any expectation of being able to participate in San Francisco business; and yet, like the Grand Trunk, it has always been an active factor in the determination of transcontinental tariffs.

The fact is that cost of production, while in trade fixing a point below which people may refuse to produce or compete, in transportation may merely mark the point at which it becomes more wasteful to stop producing than to go on producing at a loss. Hadley's classic statement is so admirable that it cannot be improved upon. "Let us take an instance from railway business, here made artificially simple for the sake of clearness, but in its complicated forms occurring every day. A railway connects two places not far apart, and carries from one to the other (say) 100,000 tons of freight a month at 25 cents a ton. Of the \$25,000 thus earned, \$10,000 is paid out for the actual expenses of running the trains and loading or unloading the cars; \$5,000 for repairs and general expenses; the remaining \$10,000 pays the interest on the cost of construction. Only the first of these items varies in proportion to the amount of business done; the interest is a fixed charge, and the repairs have to be made with almost equal rapidity, whether the material wears out, rusts out or washes out. Now suppose a parallel road is built, and in order to secure some of this business offers to take it at 20 cents a ton. The old road must meet the reduction in order not to lose its business, even though the new figure does not leave it a fair profit on its investment; better a moderate profit than none at all. The new road reduces to 15 cents; so does the old road. A 15-cent rate will not pay interest unless there are new business conditions developed by it; but it will pay for repairs, which otherwise would be a dead loss. The new road makes a still further reduction to 11 cents. This will do little toward paying repairs, but that little is better than nothing. If you take at 11 cents freight that cost you 25 cents to handle, you lose 14 cents on every ton you carry. If you refuse to take it at that rate, you lose 15 cents on every ton you do not carry. For your charges for interest and repairs run on, while the other road gets the business."

Another peculiarity of railway competition, distinguishing it from competition in trade, is that there is no such thing as abandonment of the field. This is tersely expressed by Morawetz in his Corporation Law. "It should be observed that competition among railway companies has not the same safeguard as competition in trade. Persons will ordinarily do business only when they see a fair chance of profit, and if press of competition renders a particular trade unprofitable, those engaged in that trade will suspend or reduce their operations, and apply their capital or labor to other uses until a reasonable margin of profit is reached. But the capital invested in the construction of a railway cannot be withdrawn when competition renders the operation of the road unprofitable. A railway is

of no use except for railway purposes, and if the operation of the road were stopped, the capital invested in its construction would be wholly lost. Hence it is for the interest of the railway company to operate its road, though the earnings are barely sufficient to pay the operating expenses. The ownership of the road may pass from the shareholders to the bondholders, and be of no profit to the latter, but the struggle for traffic will continue so long as the means of paying operating expenses can be raised. Unrestricted competition will thus render the competitive traffic wholly unremunerative, and will cause the ultimate bankruptcy of the companies unless the operation of their traffic which is not the subject of competition can be made to bear the entire burden of the interest and fixed charges." So profoundly modified in short are the conditions of railway competition in contrast with those in industry that it is clear beyond a shadow of doubt that a railway is essentially a monopoly. This requires no proof so far as local business in distinction from through or competitive traffic is concerned. It is equally true in respect to all traffic of sufficient importance to bring about pooling agreements or a division of the business in order to forfend bankruptcy and consolidation. To attempt to perpetuate competition between railways by legislation is thus defeating its own end. The prohibition of pooling agreements which refuses to recognize the naturally monopolistic character of the business, can have but one result, namely, to compel consolidation as a measure of self-preservation. Such legislation defeats itself, bringing about the very result it was intended to prevent.

(To be continued.)

TRACK TESTING APPARATUS.

The roading department of the Pennsylvania Railroad has installed an interesting piece of apparatus on the grounds of the South Altoona foundry to test the bearing qualities of different kinds of roadway and ballast. The particular ballast or sub-grade to be tested is placed in a heavy box that extends



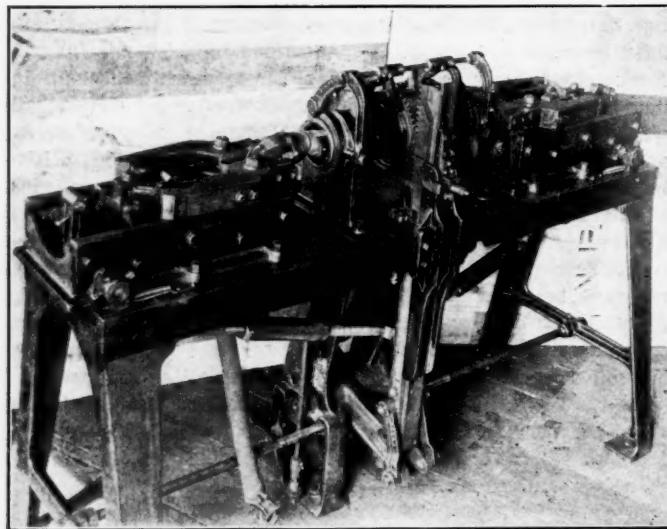
Pennsylvania Track Testing Apparatus.

across the track and has sufficient depth to serve the purpose. The track crosses this on a level and extends out on either side, terminating in a short and sharp incline. A four-wheel car on this track is loaded with pig metal to obtain any desired weight on the wheels. This car is also equipped with electric motors. A shed built across the track carries an overhead rail, from which a motor current is obtained, and a contact shoe is on the car. When current is turned on the car moves out to the end of the conductor rail, and here, as the contact is broken, the power of the motor is shut off. The car runs on until stopped by the adverse grade, and meanwhile a trip reverses the current connections to the motor. Stopped by the grade the car runs back, beneath the current rail, when its motor drives it to the other end, where the movement is again reversed. In this way the car is made to travel back and forth automatically over the track until the desired results are obtained, the number of trips being automatically regis-

tered upon a counter, so that after starting the work requires no attention or attendance. The object of the work is to obtain comparative results in a short time and under conditions that can be kept constant.

AIR-BRAKE HOSE MOUNTING MACHINE AT BRAINERD SHOPS OF THE NORTHERN PACIFIC.

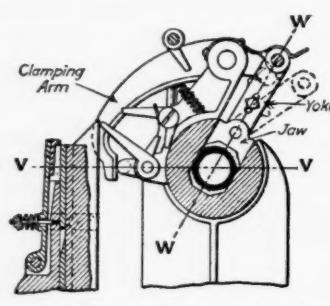
The machine for inserting couplings and nipples in air hose here illustrated has been in use at the Brainerd, Minn., shops of the Northern Pacific Railway for some time. The object



Rear View, with Coupling Inserted; Northern Pacific Air-Brake Hose Mounting Machine.

of the device is to insert the two fittings simultaneously while giving to the hose a rotary movement to avoid injury to the inner tube.

As shown by the illustrations, the hose is held in a cylindrical casting at the middle of the machine. This casting is journaled at each end and has a gear, cast integral therewith, at the center. The hose is held near each end by jaws which are pivotally connected to a yoke. This yoke is held in place by two springs bearing on its top, one at each end, which are riveted to brackets secured to the cylinder. The yoke and jaws may be removed readily by withdrawing the former from under these springs. In addition to the holding jaws just mentioned, expanding jaws are provided at each end of the cylinder for holding the ends of the hose. These are connected to the cylinder by springs which allow the end of the hose to expand as the fitting is forced in.



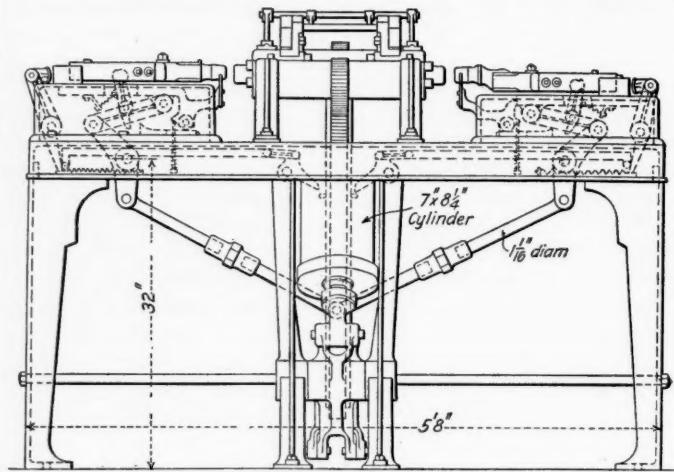
Cross-Section Through Cylinder and Rack Bar.

arm at each end of the cylinder, pivotally mounted on the same brackets to which the yoke-holding springs are riveted. The short end of this arm bears upon a block resting on the jaw and secured to the yoke. The long end of the clamping arm is raised and lowered by a short arm secured to a dog mounted on the back of the air-hose cylinder and actuated by a suitable shoulder on the rack-bar. All of this is plainly shown in the sectional views of the device.

The cylinder is rotated by the vertical rack-bar at the back of the machine, which is moved by an air cylinder beneath the machine. The initial upward movement of this bar locks or clamps the hose. Means are provided for holding the bar in

the raised position when it has reached the end of its travel; also the necessary dogs and pawls are provided for releasing the pressure on the hose and restoring the parts to their normal positions when the rack-bar descends.

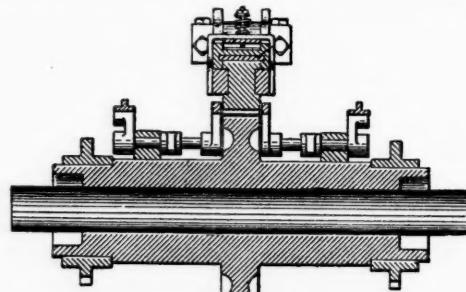
The mechanism for clamping and inserting the fittings is plainly shown by the illustrations. The parts for the nipples and for the couplings are substantially alike. The carriage on which the clamp is mounted is moved by levers from the air cylinder so that it will advance and insert the fitting as the cylinder, and therefore the hose, is rotated by the rising rack-bar. The clamp is two pivoted levers with toggle links at one end to force the jaws at the opposite end together to hold the fitting. Suitable means are provided for breaking



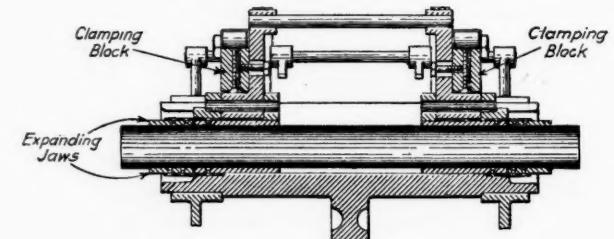
Front Elevation; Air-Brake Hose Mounting Machine.

the joint formed by the toggle links before the carriage begins its return movement.

The operator of the machine at Brainerd averages about four hose a minute, or 240 an hour, without undue exertion. The cost per hundred for this work is 8 cents. Hose mounted on this machine, on being cut apart, show no injury whatever to the inner tube by the fittings. The machine, which is



Longitudinal Section on V. V.



Longitudinal Section on W. W.

patented, is the invention of D. K. Fullerton, A. Ousdahl and E. Kronberg, of Brainerd shops, the first-named being foreman of the car department.

A bill for the construction of a railway in Java from Tjikampak to Cheribon has been passed unanimously in the Netherlands States-General.

RAILWAY SIGNAL ASSOCIATION.

The regular meeting of this association was held at the Engineering Societies' building, 39th street, New York City, on Tuesday of this week, about 200 persons being present, nearly all of them members. The chair was occupied by Vice-President H. S. Balliet. The chairmen of the principal committees made brief statements of the progress which they have made since the annual meeting.

Mr. Rudd, for Committee No. 1, reported that the members or groups of members had held in all eleven meetings. The sub-committee on aspects, by a majority vote, has endorsed the scheme of aspects which has been before the last two annual meetings, with the exception of Nos. 8 and 12. Of the schemes presented at the last meeting (Chicago) Nos. 2 and 3 have been rejected by a majority vote of the entire committee, though eight members were absent. Scheme No. 1 is preferred, because it can be more easily developed from present practice. Scheme No. 3 is held to be entirely adequate. By next month the committee expects to agree on a scheme of secondary aspects and then will formulate its report for the annual meeting. The committee will probably present designs for castings for upper quadrant semaphores, including semaphores for bracket signals and bridge signals.

Mr. Kelloway, for Committee No. 2, mechanical interlocking, reported that the time of that committee had been spent mostly in work designed to harmonize the conclusions of committees 2, 3 and 4. Mr. Allen, for Committee No. 3, power interlocking, reported progress. Mr. Elliott, for the committee on wires and cables, reported that three meetings had been held of the committee or of parts of the committee. The manufacturers have been requested to make 30-day tests of insulation resistance in water; also voltage tests of insulation. The committee expects to report in October. The same is true of the committee on storage batteries, Mr. Yocom, chairman.

Mr. Morrison then read his paper proposing modifications in the semaphore signal, which is printed on another page. The reading of Mr. Morrison's paper was followed by a long discussion.

W. H. Elliott (N. Y. C.).—No doubt the main reason for adopting the semaphore with the arm to the right of the post was because of the difficulties, on the left side, in clearing cars and engines. The upper left quadrant arrangement is probably the best, but can we reasonably make such an extensive change? It is comparatively easy for those who still move their signals in the lower right-hand quadrant, but not for those of us who have decided to use the upper right. Before the association acts we should see how much has been done toward the adoption of upper right, which has been definitely endorsed by the association. With the three-position signal the spindle supporting the arm must be $2\frac{3}{4}$ in. to one side of the post, which means that Mr. Morrison's proposal involves an expensive change and probably the reversal of the motor mechanism. The change would have to be made on a whole division at one time, for changing at random, while all-right in the day time, might be inconvenient at night on account of the possibility of interlockings of mistaking a green light when changing from two-position signals to three-position.

C. E. Denny (L. S. & M. S.).—On elevated roads where signals need not be very high all the semaphores would have to be changed and made high enough to clear the tops of the cars. I should not like to use the two kinds of signal on the same division, and therefore the change would have to be made on a whole division at a time. It does not seem worth while.

A. H. Yocom (P. & R.).—As we have miles and miles of line where the telegraph poles interfere with the view of our signals (as shown in one of Mr. Morrison's illustrations), I am favorable to placing the arm on the left of the post.

A. H. Rudd (Penn.).—Although Mr. Morrison emphasizes the simplicity of changing the signals by merely pushing along the blade in the casting, it is to be observed that his casting is a new design, not now in general use, so the change would require practically new spectacles everywhere. The merits of the upper left-hand movement were not neglected when the association's committee considered aspects preparatory to the report of 1906. I fully recognize its advantages. As one of the disadvantages of not having it, I may say that in some cases we have had to erect bridges for signals on a two-track road, because we could not move the telegraph poles back.

H. M. Sperry (Gen. Ry. Sig. Co.).—Mr. Morrison's paper is a valuable contribution. He has had to meet very unusual conditions due to the introduction of electric traction on his road, and he has been successful in meeting these conditions. He has made out a strong case. The Standard Code of the American Railway Association does indeed require that the governing arm shall be displayed to the right of the mast, but this requirement does not harmonize with the association rules for hand signals. These rules provide that the hand, flag and lamp signals shall be given by a man facing the approaching train and using the *right* arm. In other words, the association recognized, and has always recognized that hand signals must be made *across* the track or *toward* the track. These rules all confirm the position taken by Mr. Morrison. The signal across the track is undoubtedly the logical signal, and one important line—the Boston & Albany—formerly used left hand signals. To-day, when we want to make sure that a signal will not be disregarded, we place the signal arm across the track, as in the case of a draw bridge or "smash" signal.

J. M. Waldron (Int. R. T. Co.).—Why should we keep revising our standards? If we wish to retain the respect of the railway world we must weigh well our decisions before promulgating them. It is not necessary to change standards everywhere merely to accommodate special conditions here and there. Let us devote more time to standard apparatus so as to cheapen installations. This association very much needs an art commission, such as exists in New York city, to supervise municipal engineering works. The first we know there will be such a confusing variety of signals as to dwarf the aesthetic nature in the rising generation. Mr. Eck (So. Ry.) agreed with Mr. Waldron.

F. Rhea (Gen. Elec. Co.).—In the committee work three years ago we did not recommend upper left because we believed it impossible to make the change except by whole districts. Perhaps we were wrong; but uniformity is a desideratum, and we must take care about approving the idea that each road can ask the approval of the whole country for changes which are necessary to suit its own local conditions. The electric lines are likely soon to do a good deal of signaling, and the question of uniformity throughout all lines, both steam and electric, should not be ignored.

C. C. Anthony (Penn.).—One of the principal objections to Mr. Morrison's proposal is that the arm in the vertical position might deceive an engineman coming from the opposite direction, but it does not look as though this would be serious. On a bridge, surely every engineman can readily pick out his own signal, having the best possible opportunity to quickly differentiate between right and left, etc., while with bracket signals, set outside of all tracks, the eastbound and westbound signals are so far apart that there should be no excuse for mistaking one for the other. Still, Mr. Morrison has a problem in connection with the aspect shown in his Fig. 7, where the arm *before* the change is on the left of the post.

As to the merits of the scheme generally, it seems on the whole desirable. The change would not cure all of our difficulties in locating signals, but probably would cure most of them. I can see no serious danger in changing, and therefore the difficulty is only a commercial one. Probably the change

would have to be made on a whole division at a time. As to the reputation of the association, and the danger likely to be incurred by recommending changes too often, we have a good excuse for the present change because of the rise of electric roads, which now are beginning to introduce good signaling here and there. A prominent member of the Interurban Railway Association is now recommending signal practice different from that of steam roads, because their practice is not what he wants. If we aim at uniformity throughout all lines, steam and electric, we are justified in acting without waiting simply to preserve appearances.

H. C. Williams (N. Y. C.).—We have a trolley wire on a considerable length of our road, and we have had to use offset posts in order to properly locate the signals, yet the result is not quite satisfactory. Now is the time to change, as not many roads have adopted upper-right.

J. V. Young (B. & M.).—I think we ought to adopt the upper left. I have recently put up 1,700 signals and have found numerous cases where the use of upper left would have obviated difficulties.

Mr. Sperry.—Why discuss theory? Mr. Morrison has actually met the conditions. He has electric roads of two styles and had to adapt his practice to each. If a change is right this association is strong enough to make it.

The discussion was closed by the passage of a resolution to refer Mr. Morrison's paper and the discussion to Committee No. 1, and to request all members to inform that committee what they have done toward changing to upper right and what they think about the use of upper left.

The afternoon session was taken up by a carefully prepared and luminous paper by W. K. Howe, Chief Engineer of the General Railway Signal Co. on the use of alternating current in railway signaling. Mr. Howe went very thoroughly into the elementary conditions of track circuits on electric railways. His paper was illustrated by 12 diagrams showing the different arrangements now in use. The discussion on this paper dealt principally with the question of the desirability of using alternating current on tracks which are not electrified. Most railways have some trouble from interference of foreign currents with the action of automatic signals. For this trouble the alternating current is a sure cure. Mr. Elliott and others held, however, that the use of two relays in each section, one at each end, was a sufficient safeguard; therefore, the expense of alternating current, where it is not needed for other purposes, is unwarranted. The provision of a plant which can be depended upon to give an uninterrupted supply of electricity from a power house for a line of railway is a costly undertaking; there must be duplicate sets of apparatus and inspectors always on hand. The a.c. track circuit is more difficult to keep in adjustment. If you put in a.c. apparatus to-day there is small chance that when your road is electrified, say two years hence, your plant will be found adapted to the requirements.

H. A. Logue (Cumb. Val.) told of his experience with alternating current on a steam line. He has eight miles of double track equipped. The current is supplied from a point two miles outside the signaled territory. The power costs him three cents per k.w. hour, and the total cost thus far has been about \$5 per signal per year; but the plant is yet new. Each signal has a second fixed arm so that there are two lights on each post.

Mr. Rhea pointed out that while the use of current from a power station and the use of electric lights made it unnecessary to have lampmen and battersmen, still the economy in wages is limited because there must be attendants enough to deal quickly with all emergencies.

Mr. Balliet, replying to a question, said that in the two years during which electric signals have been used in the electric zone of the New York Central there had been one failure of the power supply which affected the signals. With good supervision, power failures would be exceedingly rare.

OUR ENGINEERING EDUCATION AND THE MEN IT PRODUCES.*

A few years ago a couple of Junior students were secured from the school that claims to be the foremost engineering school in the United States to work one summer on a western railway. These young fellows were specially recommended by their teacher to do the work at which they were put. They worked for three days in a vain attempt to connect two tangents out on an open prairie by a simple 3 deg. curve. Instead of getting the work done they brought in a demonstration purporting to show that the tangents could not be so connected. The same two men ran a line of levels four miles long several times and never once came within 3 ft. of the true result, nor did any two trials give results within 3 ft. of each other. I should like to give you a lot of individual experiences I have had with new college men where their lack of thoroughness in the very things they were supposed to know best has dearly cost the railway companies employing them and me, and caused the young men to be set back instead of forward in their profession, but time forbids.

The college needs to teach such students how to be men as well as how to think. And no small part of its duty is to teach them how to fight and how to stand up for one's own. And when I say they need to be taught to fight and stand up for their own, I, of course, don't mean that they should do this in any brutal or unmanly way. But it is too often the case that young men are discredited because they do not know how to assert themselves in a firm and dignified way that commands attention. It is true that "faint heart never won fair lady," nor any of the other prizes of this life. The possessor of the "faint heart" may ultimately win a title to the "mansions in the skies," but he won't win any mansions here below until the hoggishness of mankind is removed, and there seems as yet to be a good deal of this commodity left. Young men don't need easy lecture courses in our colleges where they can sit on the benches and fold their little hands in ecstasy and say "how beautiful." They must have mental and physical work to do in anything else than homeopathic doses. They ought not to have too much leeway in choosing their own work, else they tend to choose it with teachers who deal too freely in flowers and pyrotechnics, or they choose a subject because it is well known as "a snap." I like authority, and I like discipline, and the good old hickory switch for bad boys and something very like to it for obstreperous young men. There are few real men developed in this world who have not been well exercised by both, by discipline and authority.

I could give you many an instance where young men have failed to accomplish the results expected of them for lack of the qualities named in my third charge above; and yet young graduate engineers who fail as I have indicated often wonder why, in railway work, brakemen, telegraph operators, section foremen and station agents, men oftentimes who have not enough education to solve a problem in the rule of three, are promoted ahead of them. The reason is clear to the railway manager. He knows that while the college man was attending the woman-taught high school, and going to college where he sat up late at night and ruined his health by eating indigestible suppers, and where he listened to easy lectures that appealed to him intellectually only in a dim and distant way, the brakeman and the telegraph operator had been learning, by getting down close to sweating humanity, the lesson of how to "get there." And now when the railway needed men to get things done, it wanted men who had brushed up hard against other men until they knew how to act like men.

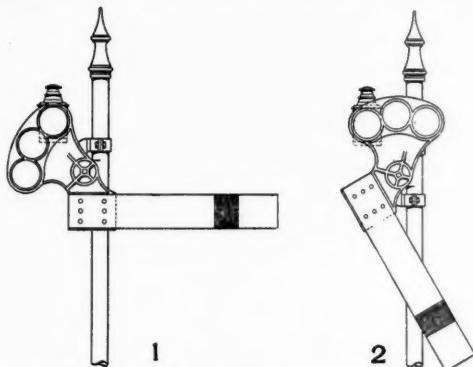
*From a lecture by W. D. Taylor, Chief Engineer of the Toledo, St. Louis & Western and Chicago & Alton railways, and formerly Professor of Railway Engineering at the University of Wisconsin; delivered before the Engineering Club of the University of Illinois, February 25, 1909, and repeated by request before the senior classes in engineering at the University of Wisconsin, March 29, 1909.

THE SEMAPHORE; UPPER LEFT VS. UPPER RIGHT.

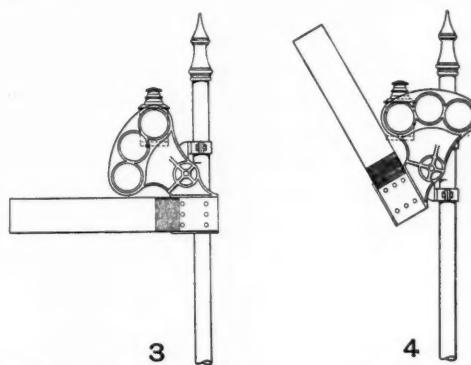
At the meeting of the Railway Signal Association in New York on Tuesday of this week; C. H. Morrison, Signal Engineer of the New York, New Haven & Hartford, presented a paper discussing the merits of different arrangements of semaphore signals, speaking particularly of the advantage of moving the arm of the signal in the upper left-hand quadrant; referring, of course to American railways, where trains on double-track lines run on the right-hand track and where the engineman is on the right-hand side of the locomotive cab. A number of signals arranged in this way are in use on Mr. Morrison's

recommended changing the signal so as to give the proceed indication in the upper right hand quadrant.

The association certainly made a step in the right direction in recommending the upper quadrant for the proceed indication, but did it go far enough when it decided to give the proceed indication in the right hand upper quadrant? The change recommended was radical and it would not have been any **more** radical to recommend the upper left hand quadrant. By recommending the upper right hand quadrant the association **certainly** overcame the objections of the old signals, but did it gain all the advantages that could have been gained by the radical changes? Some think it did not, and that therefore the



Figs. 1 and 2—Two-position Signal with Arm Extended to the Right.



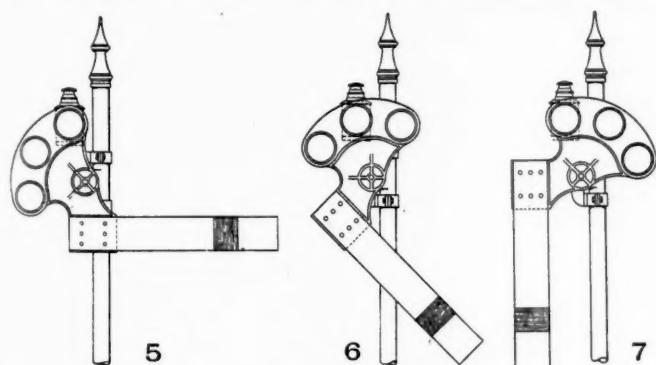
Figs. 3 and 4—Two-position Signal with Arm Extended to the Left.

road. Between East Hartford, Conn., and Vernon, the semaphores are so arranged because of a line of telegraph poles close to the track which would seriously interfere with the view of the semaphores if their arms projected to the right of the post. One of these signals was shown in the *Railroad Gazette* January 17, 1908. On the New York division (four track), where signals are attached to the overhead bridges which support the electric power wires, the signal arms are pivoted near their centers because of the narrow space in which they have to be placed in order to clear the roofs of the cars.

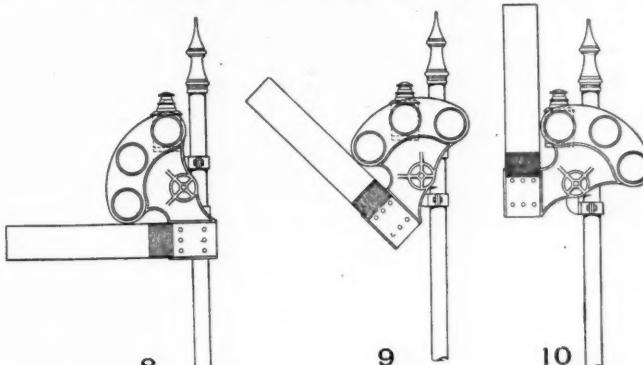
Mr. Morrison began by giving a brief review of the history of the introduction of the semaphore signal in England and in

question should be re-opened, and if the association is **wrong** it should rectify its mistake before going too far.

How many signal engineers have not found it difficult to locate signals where they can be plainly seen when the **right** of way is narrow and the telegraph pole line is close to the tracks? In cities where originally the railways owned sufficient right of way it has been found necessary to expand until the signals have been crowding over against high buildings, and it has been necessary to erect off-set poles to bring the signal from the building. Often long and deep cuts are made either through rock or long retaining walls are built, making it very difficult to locate signals through the cut without the use of off-set poles. A dark background such as is given by a



Figs. 5, 6 and 7—Three-position Signal with Arm Extended to the Right.



Figs. 8, 9 and 10—Three-position Signal with Arm Extended to the Left.

America, pointing out some of the inconsistencies of the common practice and emphasizing the disadvantages incident to the use of the counterweight. Continuing, he said:

While the signal engineers have long desired to change the signal so as to give the proceed indication in some other position than in the lower right hand quadrant, it was never seriously considered by the Signal Association until 1905, when a special committee was appointed, and after a letter ballot it was the opinion of the majority of the members voting, that they preferred to have the proceed indication given in the arc of the upper quadrant instead of the lower quadrant, and at the annual meeting of the association in October, 1906, it

building, water tank or trees, often obscures the view of the signal to such an extent that an off-set pole is used to bring the blade out where it can be seen. It is often very difficult to locate a signal on the inside of a curve on account of the short chord obtained for a view of the signal arm.

All the above-mentioned difficulties can be greatly mitigated, if not entirely overcome, by extending the blade to the left of the post and the post with the off-set will be almost entirely done away with and thereby save expense.

It may be claimed that the semaphore with the arm extended to the left when in the stop position, might be mistaken for the rear side of a signal of the old type for the opposite direc-

tion. On the majority of railways the signal blades are painted so as to be able to determine the front or the back and therefore a careful engineman ought not to make the mistake.

The benefits obtained by extending the signal arm to the left are certainly deserving of consideration by the association.

How is this change to be made? On the accompanying sketches are some suggestions as to how it could be easily made. The arm plate casting can be used for a signal with its arm extended to the right or left, either one. The scheme would be to change the arm plates on a section and at a predetermined time shift the blades from one end to the other. During the time that the arms are extended to the right, a movable counter-weight should be attached to the arm plate so it could be easily removed when the blade is shifted. Figures Nos. 1 and 2 show the two-position signal with the arm extended to the right. Figures Nos. 3 and 4 show the same signal with the arm extended to the left. Figures Nos. 5, 6 and 7 show the three-position signal with the arm extended to the right, and Figures Nos. 8, 9 and 10 show the same signal with the arm extended to the left. The signal with the arm to the

the railways are willing to make a radical change in their signal system to increase safety and obtain a better signal system, why should not the association recommend a signal that will furnish the greatest advantages without materially changing the aspect? The arrangement here proposed will be uniform as well as save expense in making the change, as the proposed signal does not require changing the stroke. With the same stroke, arm plate and blade, you can have a signal as used to-day or a signal with its arm moving in the upper left hand quadrant. If the association was wrong, and some think it was, in recommending the arm to move in the upper right hand quadrant, let us get together and rectify our mistake and withdraw our recommendation before we go too far; and recommend the upper left hand quadrant in its stead.

Fig. 11 shows one of the signals between East Hartford and Vernon, referred to above. This is a part of the main line of the old New England Railway. It is now electrified for a few miles to accommodate the trolley cars of an interurban line controlled by the New Haven.

Fig. 12 shows signals on the New York division of the New Haven road, west of Stamford, where the line is electrified, and where the signals are fixed to the bridges which support



Fig. 11—Centrally Pivoted Semaphore near East Hartford.

right giving the proceed indication in the lower right hand quadrant can be changed to a signal with the arm to the left, giving a proceed indication in the upper left hand quadrant by simply moving the blade.

Is the aspect of a signal moved in the upper left hand quadrant radically changed from what we have to-day? We have the same vertical post, we have the blade inclined in the same direction (the right hand end low) and the stripe is in relatively the same position with respect to the blade. The right hand end can be pointed, forked, round or square as desired; in fact, the only change is to put the blade to the left of the post. This change in aspect is certainly not so radical as moving the blade in the upper right hand quadrant.

There is a condition of signaling that is fast approaching that the signal engineers will be required to meet and that is the installation of block and interlocking signals on electrified lines or interurban electric railways where the trolley poles are spaced about 100 feet apart and their face about six feet from the gage of the nearest rail. Figure 14 shows how a situation of this kind was cared for on one of the New York, New Haven & Hartford Railroad Company's electrified lines. If

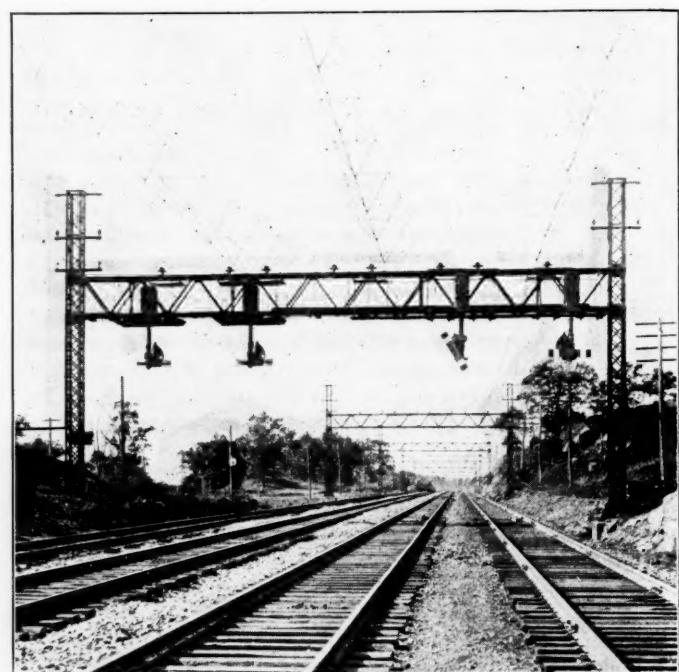


Fig. 12—Centrally Pivoted Semaphores on Electrified Section of New York Division.

the power line. We have added this four-track picture to those which appeared with Mr. Morrison's paper for two purposes: First, to show suspended signals with blades pivoted about midway between their two ends, and, second, to show how well semaphore arms appear without visible posts. In the second purpose, however, we have failed, because it is impossible to photograph the colors and because in this particular picture there is a sky background. At many of these bridges the thing that the observer actually sees is a bright red (or yellow) arm against a composite dark background; and a really good effect is produced, practically, without a post. That is to say, the vertical member on which the arm is pivoted, being dull black, in many situations presents no distinct shape, except at very short range; and yet the aspect of the arm—the difference between one that is vertical and one that is inclined—is as clear as could be desired. It must be borne in mind, though, that this satisfactory effect depends on having light-colored blades. With blades covered with smoke, signals hung beneath a bridge in this way (which usually impairs or obliterates the sky background) would be effective only at very short distances.

General News Section.

Texas papers report that the International & Great Northern is preparing to have "train auditors" to collect tickets and fares on its trains.

The Pennsylvania has finished lining with concrete its tunnels under the Hudson river and Bergen hill, and they are now ready for laying track and installing signals.

The Northern Pacific is trying a McKeen motor car in short distance passenger service to and from Duluth. If it proves satisfactory for the service intended for it, more such cars will be used by the Northern Pacific.

The New York Public Service Commission, First District, has asked the Board of Estimate to appropriate \$1,500,000 for lengthening station platforms in the Interborough Rapid Transit subway, so as to accommodate ten-car express trains.

The Continuous Securities Co., which has applied to the New York State Public Service Commission for authority to build moving platforms or sidewalks in New York City, has among its directors Edward P. Ripley, President of the Atchison, Topeka & Santa Fe.

The Santa Fe will appeal from the decision of the Federal court at Chicago by which it was fined for working telegraph operators in "broken tricks" in alleged violation of the hours of labor laws. (See *Railroad Age Gazette*, April 23, 1909, page 913, and April 30, page 954.)

H. I. Miller, President of the Chicago & Eastern Illinois, has been decorated by the Emperor of Japan with the Order of the Sacred Treasure as a token of esteem for services rendered by him to a commission of the Japanese government which visited the United States two years ago for the purpose of getting suggestions and information as a basis for re-organizing the railways of Japan.

Percy R. Wooley, a fireman on the Central of New Jersey, has received from the company the gift of a gold watch in recognition of his devotion to duty in stopping a passenger train on April 24. While the train was running at high speed near Hamilton, N. J., an accident in the cab disabled the engineman and made it impossible for the fireman to get into the cab, but he quickly climbed down behind the tender and opened the air-brake pipe, thus stopping the train.

The Pennsylvania Railroad, co-operating with the Pennsylvania State College of Agriculture, on June 1 ran a farmer's special train from Lemont to Lewisburg, Pa. This movement differs from other similar ones in that the railway is using a "follow-up" system to create added interest in scientific farming. On March 10 a special train running from Lewisburg to Lemont collected the station agents between those points and took them to State College, Pa., that they might see the work which is being done there, and return to their homes as missionaries in the cause of better farming. The next step is this farmers' special. This will give the professors from State College a chance to instruct the farmers in fundamental principles, which, if applied, will increase the crops of the farms. Following the farmers' special, the railway will on June 10 run an excursion from points between Montandon and Lemont to State College. This will afford the farmers an opportunity to visit the experiment station and to witness the results that have been accomplished by the practices which they have been urged to adopt.

A bill to incorporate "the Boston Holding Railroad Company" has been passed by the Massachusetts Senate. The bill makes Walter C. Baylies, Robert M. Burnett, Frederic C. Dumaine, and successors, a corporation with the name of the Boston Holding Railroad Company for the sole purpose of acquiring and holding the whole or any part of the capital stock, bonds and other securities of the Boston and Maine, and of voting stock so acquired. Section 2 fixes the stock of the new corporation at \$100,000, and gives the corporation power to increase or reduce the stock, with the approval of the railway commissioners. It further says that a majority of the Boston and Maine directors and the

directors of the new corporation shall be citizens of Massachusetts. Section 3 says that the Boston and Maine stock acquired by the new corporation shall not be sold without express authority of the legislature, and the railway commissioners shall report on the expediency of any proposed sale. Securities of the Boston and Maine, which may be acquired by the new company, shall not be sold or pledged by it without approval of the railway commissioners. Section 4 says that any railway incorporated now under the Massachusetts laws may guarantee the principal, dividends and interest of securities of the new company and may hold its stock and bonds, provided that the shares of the new company shall not be sold until such guarantee has been given. Any railway which acquires this stock shall not sell it without the authority of the legislature. The state may at any time, by act of the legislature, take by purchase or otherwise, the securities of the new company, provided it takes them all, the manner of determining the compensation being the same as now fixed by law.

Proctor Tunneling Machine.

The Terry, Tench & Proctor tunneling machine was described in the *Railroad Age Gazette* of September 11, 1908, page 929. A revolving head carrying 25 piston drills, driven by compressed air, chips away the face of the rock, the muck being carried to the rear of the machine by a belt conveyor. During the past week this machine has been at work driving an 8-ft. sewer in the Grand Central Station excavation in New York. So far it has only been in operation for short periods of about 15 minutes each. In such periods it has driven the tunnel heading at the rate of about 18 in. an hour, with air pressure varying from 55 to 70 lbs. and averaging not much over 60. The machine is designed for 100 lbs. pressure and should have at least 80. The latter pressure is the maximum that is available at the Grand Central at present. The rock is hard, being the lower part of the mica schist outcrop which forms Manhattan island. It also has some quartz in it. The muck was quite fine, the rock coming off in very small chips and powder. The Terry, Tench & Proctor Tunneling Machine Co., 131st street and Lexington avenue, New York, is back of the machine.

Missouri Electric Headlight Bill Vetoed.

Governor Hadley of Missouri has vetoed the bill passed by the legislature of that state requiring the railways to equip locomotives with electric headlights of 1,500 candle power.

Following the passage of this bill various headlights were tested at Jefferson City by representatives of the railways and of the railways' employees who had asked for this legislation, and an agreement was entered into in which the executive officers of the Missouri lines pledged their companies to "equip and keep equipped for use on all locomotives used in main-line service, headlights of power that will outline the figure of a man on or adjacent to the track, plainly visible at a distance of 800 feet, preceding the locomotive. The visibility herein mentioned is understood to be measured by and under ordinary night conditions, and for the normal sight of a person having the usual visual capacity required of a locomotive engineer at his place in charge of a moving locomotive. The conditions of this contract are to be carried out on or before June 1, 1910."

Governor Hadley had indicated that he would veto the act if the roads and their employees could reach an agreement. In his veto message he said:

"In taking this action I wish to call attention to the fact that if other controversies between the railway companies and the public could be dealt with in the same spirit of fairness with which this question has been met and decided, we would hear much less complaint about unjust legislation and much less complaint about unfair treatment from the railway companies. It is both the right and duty of the people, through the officers whom they have chosen to represent them,

to regulate the operation of roads in such a way as to secure reasonable and equal rights and a safe and proper service. This power should be conservatively exercised, and in such a way as to give the railway companies at all times a reasonable return on the value of their investment.

"That much of the legislation enacted along these lines is inadvisable and unfair is unquestionably true. That the railway companies are themselves responsible for the enactment of much of this legislation is also unquestionably true, and if the conflicting interests between the public and the railway companies could be dealt with by a board composed of men trained and experienced in this work, I am satisfied that far more satisfactory and beneficial results would be secured both to the people and the railway interests."

Railway Legislation in Wisconsin.

The legislature of Wisconsin at its recent session passed a law providing that no freight rate shall be increased without previous notice of 30 days to the railway commission, and giving the Commission power to suspend the application of any proposed rate until the railway shall have satisfied the Commission as to its reasonableness.

Another act empowers the Commission to order changes in highways when these are necessary in connection with elevation or depression of tracks, and to assess damages and divide expenses due to such changes.

Another act provides that where the distance between a station platform and the lowest step of a passenger car exceeds 19 in., a portable step must be provided.

Capacity of the N. Y. C.

On the New York Central 297,634 more carloads were handled this May than last. The total is a little under that of the same month in 1907. Our roads are to-day able to handle at least 20 per cent. more traffic than they handled during the boom times of 1907. Even now, with our loaded car movement only a little behind that of 1907, you would scarcely know that there was any freight moving through the yards, so smoothly and regularly does it pass through. Our fast freight trains are now on time just as regularly as the Twentieth Century.

Since the time of the great congestion on our lines, which was almost wholly due to conditions on the Boston & Albany and the Boston & Maine, we have spent \$20,000,000 on the lines east of Buffalo.—*W. C. Brown in Wall Street Journal.*

A South Carolina View of the Georgia Strike.

A despatch from Atlanta referring to the unsettled points in the issue between the Georgia Railroad and the employees, says: "There are several reasons why the Georgia Railroad is considered a home institution. It employs Georgia men only. Its firemen and engineers and conductors and even its brakemen are all natives of towns and villages through which its trains run. These men have intermarried until nearly whole communities are related. * * * Many come from old and highly respected families and the idea of working with a negro is abhorrent to them."

We are not prepared to say whether this is the "reason" for the differences given by the railway men, but we are prepared to declare and to prove such alleged "reason" to be tommyrot. If that "sentiment" has developed along the line of the Georgia road it has been manufactured. It is not normal, either in Georgia or in the South. A fireman is regarded as the engineer's helper, the engineer's man, and in the South, where a white man prefers "bossing" a negro rather than one of his own color, there is, or there certainly was, a preference by white engineers for negro firemen.

The engineers on the Georgia road may belong to "highly respected families," but in engines on other roads and in thousands of private and in corporation blacksmith shops and foundries in the South white men have negro helpers in relations just as close as that between engineer and fireman. Neither the white mechanic, the white farmer, nor the engineers on other railways of the South are "horrified" at "the idea of working with a negro."—*Columbia State.*

Prizes for Engineers.

The Engineers' Society of Pennsylvania, E. R. Dasher, Secretary, Harrisburg, asks architects, electrical and civil engineers, and others, to compete for prizes, to be paid from a fund established by the society, for the best design of ornamental poles for the support of lights and trolley wires. Plans, specifications and estimates of cost must be submitted. The competition is to close July 15. For information address Paul A. Cuenot, Chairman, Harrisburg, Pa.

The Baldwin Twins.

The two 430,000-lb. articulated compound locomotives, built by the Baldwin Locomotive Works for the Southern Pacific, and illustrated in the *Railroad Age Gazette*, April 30, last, are being tested in regular service on the heavy grade divisions east of Sacramento. An informal report telegraphed from Sacramento, June 4, is as follows:

"The Baldwin twins are doing fine. Engine 4001, out from Roseville this morning, pulled a train of 1023 tons, an average of 11.6 miles per hour on the 2.2 per cent. grade to Goldrun, 46.7 miles; consumed 1883 gallons of fuel oil; receiver pressure, 75 lbs.; receiver temperature, 340 degrees; combustion chamber, 560 degrees; smoke arch, 360 degrees; feedwater, 300 degrees. This engine will handle 1,250 tons on a 2.2 per cent. grade or 30 per cent. more tonnage than two of the standard consolidation engines at a speed of eight miles per hour, with both engines steaming exceptionally free."

A Costly Municipal Ferry.

The Staten Island municipal ferry is costing the city of New York about \$1,600 a day. Including interest charges, its operation for the year 1908 showed a deficit of about \$600,000, and with the opening of the Stapleton branch and the calls for two new boats the cost to the city will be greatly increased. The actual operating expense last year was \$1,064,060, and the receipts only \$667,928.

The receipts were \$11,883 less than they were in the preceding year. Through this ferry deficit the Borough of Richmond is practically eating up all that it contributes to the common purse in taxes.

The old Staten Island ferry, with its ramshackle equipment managed to break just about even in the operation of the ferry, and in those days the treasury of the city received a minimum revenue of \$43,500 a year from the private owners of the ferry. Under the municipal ownership plan this income of \$43,500 has been converted into an annual \$600,000 deficit to give the Borough of Richmond (Staten Island) its improved facilities.—*New York Sun.*

Crop Conditions.

The crop reporting board of the department of agriculture estimates as follows:

The area sown to spring wheat is about 18,391,000 acres, or 1,183,000 acres (6 per cent.) more than sown last year. The condition of spring wheat on June 1 was 95.2, as compared with 95.0 on June 1, 1908, 88.7 on June 1, 1907, and 92.6 the June 1 average of the past ten years.

The condition of winter wheat on June 1 was 80.7, as compared with 83.5 on May 1, 1909, 86.0 June 1, 1908, 77.4 on June 1, 1907, and 80.5 the June 1 average of the past ten years.

The condition of rye on June 1 was 89.6, against 88.1 on May 1, 1909, 91.3 on June 1, 1908, 88.1 on June 1, 1907, and 89.4 the June 1 average of the past ten years.

The area sown to oats is about 32,422,000 acres, or 78,000 acres (0.2 per cent.) more than the area sown last year. The condition of the crop on June 1 was 88.7, as compared with 92.9 on June 1, 1908, 81.6 on June 1, 1907, and 88.4 the June 1 average of the past ten years.

The area sown to barley is about 6,881,000 acres, or 235,000 acres (3.5 per cent.) more than the area sown last year. The condition of the crop on June 1 was 90.6, as compared with 89.7 on June 1, 1908, 84.9 June 1, 1907, and 90.6 the June 1 average of the past ten years.

M. C. B. Train Lighting Circular.

The equipment of passenger cars with electric lights, either by the straight storage or axle-lighting system, is being rapidly extended by a large number of railways. In the interchange of these electrically lighted cars, some trouble is experienced in charging the batteries or operation of the systems, by reason of lack of information concerning the make, type, charging rate, etc.

It has been suggested that the Master Car Builders' Association prepare a form of card to be pasted in the interior of all such electrically lighted cars to assist in the proper operation of the electric-light equipment. The executive committee believes the suggestion to be a good one, and in order that it may be made operative at as early a date as possible, would recommend that the members of the association owning or operating such cars at once take steps to place in each car so equipped a placard containing complete information regarding the system used and the batteries.

Street Railway Association of the State of New York.

The twenty-seventh annual convention will be held at Fort Henry Hotel, Lake George, N. Y., June 29 and 30. J. H. Pardee, 611 W. 137th street, New York, is secretary.

There will be reports of committees on: Electric Express and Freight Service; City Rules; Classification of Accounts; Use of Curtains in Car Vestibules; Signaling Interurban Cars at Way Stations, and Carrying Musical instruments on Passenger Cars. The papers will be: Electric Railway Accounting, School of Trainmen and Latest Developments in Electric Railway Apparatus.

International Association for Testing Materials.

The fifth congress of the International Association for Testing Materials will be held on September 7-11, 1909, in Copenhagen, Denmark. With the exception of delegates from public bodies, only members of the association will take part in the congress.

Among the papers and reports to be presented are some on the following subjects: Metallography; Special Steels; Heat Treatment of Spring Steel; Hardness Testing; Impact Tests; Testing Metals by Alternating Stresses; Testing of Cast Iron; Influence of Increased Temperature on the Mechanical Qualities of Metals; Nomenclature of Iron and Steel with a Definition of Their Microscopic Constituents; International Specifications for Testing and Inspecting Iron and Steel; Conclusions Drawn from Studies on the Qualities of Rails, as Basis for Conditions of Tender for Rails; Testing Steam, Gas and Water Pipes; Spark Method for Grading Steels; Reinforced Concrete; Progress in the Methods of Testing Cement; Cement in Sea Water; Weathering Resistance of Building Stones; Oils; Wood; Paints on Metallic Structures.

International Railway Fuel Association.

The first annual meeting of the International Railway Fuel Association will be held at the Auditorium hotel, Chicago, on June 21, 22 and 23. The session on the first day will be called to order at 9:30 A. M., at which time members will proceed to dispose of necessary business as provided in section 5 of the by-laws. The following papers will be presented.

"Proper Method of Purchasing Fuel. Also the Permanent Interests of the Producer When Located on the Consumers' Rails." Committee, Chairman, Thomas Britt (C. P.); G. R. Ingersoll, (L. S. & M. S.); H. R. Lloyd, (C. M. & St. P.)

"Standard Type or Types of Coaling Stations." Committee, Chairman, J. H. Hibben, (M. K. & T.); S. L. Yerkes, (Queen & Crescent); C. F. Richardson, (St. L. & S. F.).

"Best Method of Accounting for Railway Fuel." Committee, Chairman, J. P. Murphy, (L. S. & M. S.); C. G. Hall, (R. I. Frisco); W. H. Grassman, (N. Y. C. & H. R.).

"Difference in Weights; Legitimate Shrinkage Allowable." Committee, Chairman, F. C. Maegly, (A. T. & S. F.); W. J. Jenkins, (M. P.); Chas. Keith, President Central Coal & Coke Co., Kansas City, Mo.

"Difficulties Encountered in Producing Clean Coal for Loco-

motive Use." Committee, Chairman, Carl Scholz, (R. I. Frisco); J. Van Houten, (St. L. R. M. & P.); J. R. Ryan, G. M., Corona Coal & Iron Co., Corona, Ala.

"Briquetted Coal and Its Value as a Railway Fuel," C. T. Malcolmson, Briquetting Engineer, Roberts & Schaefer Co., Chicago, Ill.

On June 22, through the courtesy of the United States Steel Corporation, the members and their wives will visit the new steel plant at Gary, Ind. Transportation to Gary and return will be provided by the executive committee which has chartered the new steel passenger steamship "United States." The boat will leave the Indiana Transportation Co.'s docks at the south end of the Clark street bridge, Chicago, at 9:30 A. M. There will be music and refreshments on board and the return trip will end at about 4:30 P. M. Admission to the steamer will be by card and members are requested to advise the secretary, D. B. Sebastian, 327 LaSalle Station, Chicago, at once, giving the names of members who expect to make the lake trip so that passes may be issued.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
 AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, O.; June 22-25; Albany, N. Y.
 AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fitch, Monadnock Bldg., Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—R. E. Wilson, Ry. Exchange, Chicago.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 16-18, 1909; Atlantic City.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 29-July 3; Atlantic City.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 18-22; Denver, Colo.
 ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June, 1910; Colorado Spgs.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago, June 23-25, 1909; Detroit.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York; June 22-23; Montreal.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. Fred. & Pot. R. R., Richmond, Va.; June 16, 1909; Old Point Comfort, Va.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago, June 21-23, 1909; Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—E. C. Cook, Royal Insurance Bldg., Chicago.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 21-23, 1909; Atlantic City.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soc. Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
 RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collinwood, Ohio.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Nov.; Washington.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago; Sept. 7-8; Fort William Henry, Lake George, N. Y.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La.
 SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R.R., East Buffalo, N. Y.; September, 1909; Denver.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago, 1st Wednesday, except July and August; Chicago.

Traffic News.

For traffic agreement between the Kansas City, Mexico & Orient and the Chicago & Alton see editorial columns.

The American Express Co. has petitioned the Superior Court of New Hampshire to annul the order recently made by the State Railroad Commission reducing the express company's rates.

A cargo of freight arrived in New York City on May 31, which left Hongkong April 8, and came across the Isthmus of Tehuantepec, making the time 53 days. A steamer of the Mexican-Oriental Steamship line made the Pacific trip, delivering the freight at Salina Cruz, Mexico, the western terminus of the Tehuantepec Railway, and the goods were taken from the Atlantic terminus of the railway by the American-Hawaiian Steamship Co.

Beginning with June 20 the New York Central Lines will have a 25-hour train from Chicago to Boston, and will put through cars on the westbound afternoon fast mail from New York, No. 21, so as to have virtually a second westbound Lake Shore Limited. The Chicago-Boston train will leave Chicago on the Lake Shore at 8:25 a. m. (train No. 4), and arrive in Boston at 10:30 a. m. Train No. 21, leaving New York at 5:20 p. m., will have sleeping cars for Toronto, Cleveland and Chicago, and will run to Chicago in 24 hours 40 minutes. The midnight express, No. 59, will leave New York at 12:07 a. m., and run to Buffalo about two hours quicker than at present.

More than 700 Virginia farmers of Middlesex, Caroline, Westmoreland, King George, Richmond, Lancaster and Essex counties heard the lectures delivered on the Farmers' Special Instruction Steamboat operated on the Rappahannock river on June 4 and 5 by the Maryland, Delaware & Virginia Railway. The Educational Steamer left Fredericksburg at 6 o'clock Friday morning. Owing to the fact that the farmers along the Rappahannock river have a soil that is adapted to truck farming, their attention was directed especially to that feature of agriculture. W. W. Sproul, of Staunton, a successful potato grower, made thirty-minute talks at every wharf visited by the special. He instructed the farmers in methods for preventing "blight," and gave them the benefit of his experience of the last ten years.

New Southern Pacific Steamship.

The Newport News Shipbuilding & Dry Dock Company has taken a contract to build for the Southern Pacific Company four passenger and freight steamers to run between New York and ports on the Gulf of Mexico, the contract aggregating \$3,000,000. The steamers are to be 450 feet long and will have a speed of 15½ knots an hour.

Demurrage Hearing at Washington.

The hearing on the Demurrage Rules proposed by the sub-committee of the National Association of Railway Commissioners (printed in the *Railroad Age Gazette* May 21) was held in Washington June 4 and 5. Commissioner Lane, chairman of the sub-committee, presided. Commissioners Eaton, of Iowa; Gothlin and Sullivan, of Ohio, and others were present. The hearing room was crowded with representatives of railways and shippers. The American Railway Association had arranged for a sort of steering committee, which consisted of Arthur Hale, General Agent, as Chairman; Clyde Brown (New York Central) and E. B. Boyd (Missouri Pacific).

Among the other railway men present were Mr. Voorhees, of the Reading; Mr. Huntington of the Central of New Jersey; Mr. Trump, of the Pennsylvania; Mr. Phelps and Judge Trabue, of the Louisville & Nashville; Mr. Bierd, of the New Haven; Mr. Starr, of the Pennsylvania Company; Mr. Daly, of the Illinois Central; Mr. Ballantine, of the Rock Island; Mr. Jackson, of the C. & E. I. There were 50 or 60 representatives of shippers also present, including Mr. Moore, of the Republic Steel Co.; Mr. Belsterling, of the American Bridge Co.; Mr. Montgomery, of the International Harvester Co.;

Mr. Ives, representing the New England Chamber of Commerce, and Mr. Seeds, representing the Illinois shippers.

Mr. Lane opened the proceedings with a brief address, in which he called attention to the necessity of a practical demurrage plan for securing full use of cars and the advantage of uniformity in demurrage rules. The railways, through their committee, presented a memorandum covering the general principles which should be embodied in any demurrage plan, as follows:

"The general principles that should govern the formulation of demurrage rules are as follows:

"1. The prompt release of loaded cars and the prompt loading of empty cars are essential to the efficient operation of railways in the interest of both shippers and carriers.

"2. The undue retention of cars by consignees or consignors prevents the distribution of empty cars to other patrons and causes car shortages in times when business is prosperous.

"3. The service to be rendered by the carriers in consideration of the freight charges does not include the use of the cars for storage purposes by the consignee.

"4. The occupancy of cars by consignees or consignors is of value to them and a cause of expense to the railways.

"5. The only method of preventing the undue detention of cars by consignees or consignors is by the imposition of charges for their occupancy and that of the tracks upon which they stand, and these charges are fully justified by the conditions as stated above in 1, 2, 3, and 4.

"6. These demurrage charges should be uniform under practically similar conditions of service in order to avoid unjust discrimination."

The rules were then discussed seriatim, and almost every rule was criticized, the criticisms coming from both shippers and railway companies. There were a great many pleas for additional time on certain commodities and much argument for and against the average rule, but practically no objection was made to the theory of car demurrage, and before adjournment there was what was essentially an agreement between the shippers and the railways to this effect.

The question of reciprocal demurrage was raised only once, and the chairman decided that it could not be considered in connection with these particular rules.

In view of the pressure for the inclusion of an average rule it was stated, for the railways, that there was less objection to an average agreement which covers only one kind of cars than to the usual average agreements which cover all kinds of cars; and it was intimated on the part of the sub-committee that it might prefer an average rule to a "bunching" rule.

The railways appeared to be a unit in favor of the old private car rule, which exempts from demurrage rules only private cars on the tracks of their owners, and none of the shippers objected to this excepting the representatives of the independent tank lines who advocated the exemption of tank cars at all points, on the plea that tank cars are so entirely and completely private cars that the general public has no interest in them. If this were admitted it would be hard to see what jurisdiction the various commissioners could have over them.

We understand that when the sub-committee has finally passed upon these rules they will next be considered by the full committee on car demurrage, which will report to the National Association of Railway Commissioners in October. If they are approved by that body there will be a chance for the American Railway Association to act on them in November.

Rebate Fines on the Missouri Pacific.

Judge Trieber, of the United States District Court, last week fined the St. Louis, Iron Mountain & Southern Railway Co. \$15,000 for paying grain rebates in the latter part of 1907. The company pleaded guilty. At the same time Wade H. Ellis, United States Assistant Attorney General, made the following explanatory statement:

"It appeared from the investigation that the payments were made by the direction of the former traffic manager of the company not only without the direction or knowledge of the superior officers of the railway, but in direct violation of express orders given by Vice-President C. S. Clarke, who upon assuming control of the property in St. Louis gave explicit orders that no rebates of any character should be given and no preferences of any kind shown to any shippers."

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF APRIL, 1909.
(See also issue of June 4.)

Increase in operating revenues										Operating expenses		Operating expenses		Operating expenses	
Name of road		Mileage operated at end of period		Operating revenues—Total		Maintenance of way and structures, equipment		Trans- portation		Outside operations, net		Net operating revenues (or deficit)		Operating expenses	
				Freight		Passenger, inc. misc.		Traffic		General		Total		Total	
Atlantic Coast Line	Birmingham & Atlantic	4,648	\$1,616,729	\$50,118	\$2,310,603	\$312,590	\$727,832	\$34,492	\$740,582	\$62,100	\$1,230,689	\$886,914	\$103,013	\$783,901	\$150,169
Concord & Maine	642	1,444,829	30,577	1,86,000	232,647	32,923	40,851	1,381,902	2,192,501	1,049,522	1,17,103	8,000	150,033	902,893	\$116,203
Central of Georgia	2,425	1,943,067	1,037,405	3,242,023	239,031	42,763	26,619	17,133	2,07,992	31,951	1,049,522	4,900,000	4,404	150,033	23,987
Central of New Jersey	1,916	1,543,885	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	1,06,556	35,697
Central of Vermont	668	1,393,085	343,022	2,045,823	166,675	17,133	30,032	24,610	503,523	41,782	1,036,222	1,009,601	788*	922,439	123,653
Chicago & Alton	411	2,055,542	70,729	227,797	16,842	22,405	7,447	124,182	12,361	13,931	7,418	194,042	98,755	32,000	122,867
Chicago, Rock Island & Gulf	998	579,298	281,613	947,340	97,402	30,059	317,684	28,225	605,553	341,787	1,056,000	325,225	35,551	305,219	3,551
Chicago, Rock Island & El Paso	111	40,668	22,116	68,038	8,175	8,609	1,875	18,830	1,662	3,7939	30,096	2,492	207,933	13,518	
Chicago, Rock Island & Gulf	527	180,581	50,032	232,047	29,705	17,979	6,028	10,2400	10,2400	1,054,153	1,054,153	2,492	6,293	36,189	
Chicago, Rock Island & Pacific	7414	2,788,775	1,212,328	4,257,729	56,638	538	40,506	113,668	1,738,969	131,355	3,019,106	1,278,723	15,500*	172,124	1,080,999
Chicago, Rock Island & Pacific	248	887,470	121,448	103,953	21,114	21,114	2,685	2,685	531,103	44,480	1,632,215	21,575	4,100	17,475	141,844
Chicago, Rock Island & St. Louis	1,982	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Delaware & Hudson	1,845	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	2,516	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	584	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	223,103	116,200	327,247	29,705	17,979	6,028	10,2400	10,2400	1,054,153	1,054,153	2,492	6,293	36,189	
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735,832	123,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	83,297
Florida East Coast	523	1,282,993	367,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	1,734,344	82,248
Florida East Coast	523	258,568	110,535	440,083	55,467	36,666	55,467	65,452	129,060	1,054,050	1,054,050	1,054,050	1,054,050	1,054,050	251,254
Florida East Coast	523	1,388,704	501,022	2,109,204	270,410	396,452	67,170	51,170	11,031	1,137,364	9,083	208,850	4,767,980	4,252*	740,000
Florida East Coast	523	1,200,654	187,191	1,735											

*Deficit. \uparrow Loss. \uparrow Decrease.

Car Surpluses and Shortages.

Arthur Hale, General Agent of the American Railway Association, in presenting the bulletin giving a summary of car surpluses and shortages by groups from February 19, 1908, to May 26, 1909, says:

"A decrease is shown from our last report of 10,589 in the number of surplus cars, bringing the total down to 273,890.

INTERSTATE COMMERCE COMMISSION.

Rates on Yellow-Pine Lumber.

Chicago Lumber & Coal Co. et al. v. Tioga Southeastern et al. Opinion by Commissioner Clements.

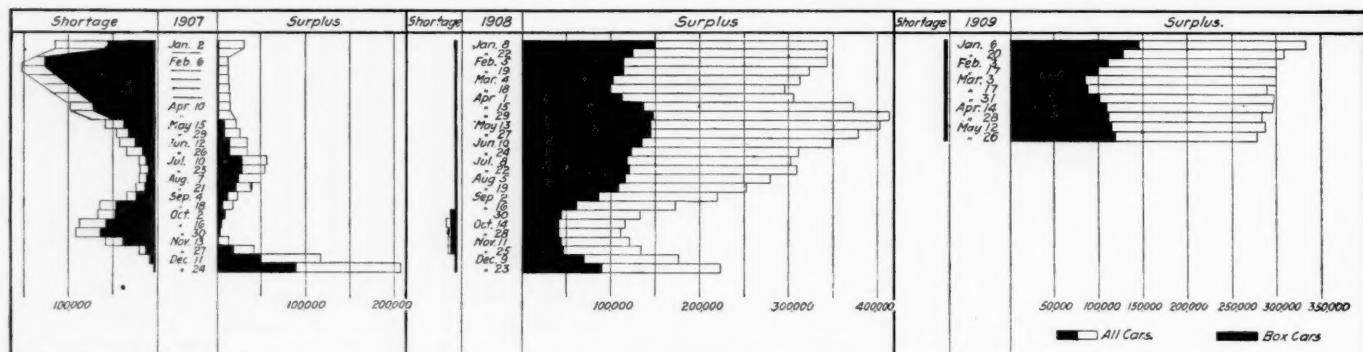
Complainants manufacture yellow-pine lumber in Arkansas and northern Louisiana and ship it over defendants' lines to

CAR SURPLUSES AND SHORTAGES, FEBRUARY 19, 1908, TO MAY 26, 1909, INCLUSIVE.

Number of roads.	Surpluses.					Shortages					
	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	
May 26, 1909	158	118,257	14,940	97,006	43,687	273,890	83	99	1,011	47	1,240
May 12, 1909	158	113,601	16,574	105,684	48,620	284,479	78	4	22	83	187
April 28, 1909	161	107,665	16,487	110,538	47,638	282,328	144	106	74	173	497
April 14, 1909	163	108,291	17,692	122,982	47,698	296,663	80	135	109	19	343
March 31, 1909	158	101,344	20,428	128,546	46,282	296,600	158	98	116	27	399
February 17, 1909	159	98,512	23,924	135,208	43,797	301,441	266	97	11	96	470
January 20, 1909	162	127,204	26,723	116,680	41,057	311,664	163	21	139	35	358
December 23, 1908	158	87,350	16,247	79,595	38,885	222,077	471	42	289	217	1,019
November 25, 1908	160	45,194	12,157	43,854	31,624	132,829	7,923	178	900	209	9,210
October 28, 1908	158	39,383	10,185	31,541	29,803	110,012	8,175	167	2,261	236	10,839
September 30, 1908	160	42,593	10,365	49,795	31,039	133,792	7,313	450	224	127	8,114
August 19, 1908	160	106,367	13,494	92,500	40,642	253,003	465	90	105	194	854
July 22, 1908	166	120,580	14,401	125,739	47,960	308,680	115	37	330	27	509
June 24, 1908	163	123,112	18,042	130,149	41,995	313,298	266	34	120	31	451
May 27, 1908	160	144,697	20,075	162,695	54,437	381,904	82	13	12	18	125
April 29, 1908	159	147,971	24,350	186,742	59,542	413,605	145	42	16	64	267
March 18, 1908	160	103,509	25,122	119,205	49,206	297,042	533	151	250	73	1,007
February 19, 1908	161	113,776	30,088	134,217	44,432	322,513	697	141	249	162	1,249

Box cars show an increase of 4,656, while coal and gondolas decrease 8,678. There are also decreases of 1,634 in flats and 4,933 in miscellaneous. The largest decreases are in groups 3 (Middle) and 6 (Northwestern), while groups 1 (New England), 5 (Southern) and 9 (Southwestern) report slight increases."

markets in central freight association territory. By simultaneous action the defendants established rates of 16 cents per 100 lbs. to Cairo, Ill., from the entire producing territory, resulting in an advance of 2 cents per 100 lbs. on lumber originating in complainants' territory, but in other portions of the producing territory the rates remained stationary and



Car Surpluses and Shortages in 1907, 1908 and 1909.

The accompanying table gives surpluses and shortages for the period covered by the report and the chart shows surpluses and shortages in 1907, 1908 and 1909.

Spokane Rate Question Arranged.

As a result of the conference Wednesday between attorneys of the Harriman lines and representatives of Spokane business interests, arrangements were reached as to the rates—both class rates and commodities rates—to be effective July 1 next. The agreement is to the effect that the class rates laid down in the decision of the Interstate Commerce Commission in the Spokane case are to become effective July 1 next. The commodities rates as laid down in that decision are to be suspended pending a hearing which the commission will accord early in the fall, probably at Spokane. The greater part of the freight in this territory moves on commodity rates.

Railroad Commissions.

The coal rate schedule issued by the Railroad Commission of Missouri, effective on May 1, and which was suspended until June 10, has been again suspended until July 10.

there were material reductions in some quarters. Complainants attacked the advance as unreasonable and discriminatory. The rates were not unreasonable *per se* and, under all the circumstances, there is no reason for interfering with the present adjustment.

The fact that the advance was the result of conference and understanding between the carriers is entitled to be duly considered in connection with other circumstances bearing on the reasonableness of the rates under consideration, but this fact does not of necessity establish the unreasonableness of such rates. Each case must be decided upon its own merits. A substantial dissimilarity in transportation conditions are found to exist in the producing territories east and west of the Mississippi river. Where competitive conditions among shippers are the leading considerations that induce a complaint, the commission in determining the reasonableness of rates must have due regard to transportation conditions and the rights of the carriers as well as the interests of shippers. The movement of traffic is encouraged and increased when carriers adjust their charges to meet mercantile interests, but they are not obliged in adjusting their charges to equalize the value of commodities in their final distribution. A carrier is not guilty of discrimination because it does not afford as favorable rates as others serving a different territory, though the products carried by each are brought to the same market.

The law does not deal with carriers collectively as a single unit or system, but its commands are directed to each with respect to the service which it is required to perform.

The decision of the commission must be based upon broad principles of justice, keeping in view the welfare of the public as well as the interests of carriers and shippers in the entire territory involved, and under the facts and circumstances of this case it should not be limited to those interests located in a restricted part of the producing territory. Blanket or group rates in many cases, especially with reference to particular commodities, are of great advantage to the public without serious injustice to any interest, though there is of necessity more or less disregard of distance and varying degrees of inequality.

STATE COMMISSIONS.

The Nebraska State Railway Commission held in the case of *Florence Lumber & Coal Co. v. Chicago, St. Paul, Minneapolis & Omaha*, that the statute creating the commission did not give it the power to award reparation.

The Nebraska State Railway Commission has held that where a higher rate is charged for the shipment of horses that are to be used in the show ring than on horses that are to be exhibited in the show ring, there is an apparent discrimination, but since the carriers have voluntarily given a reduced rate on certain classes of freight, namely, the horses for use in the show ring, the commission cannot compel the carriers to extend this reduced rate to other classes of freight.

The Railroad Commission of Louisiana has adopted a rule providing that shipments, including freight returned for repairs, loaded on open cars, are subject to a minimum charge equal to that for 5,000 lbs., at first class rate, for each car used. Any article too large to be loaded through the side door of a 36-ft. box or stock car or too long to be loaded through the end window, shall, unless otherwise specified in the classification, be charged actual weight for the class rate, provided that in no case shall the charges for the entire shipment be less than for 5,000 lbs. at the first class rate.

The New York Public Service Commission, Second district, has appointed William L. Derr inspector in its division of transportation, succeeding Edmund Van Hoesen, resigned to accept a position with the State Engineer and Surveyor. For a number of years Mr. Derr was engaged with the Erie, being at different times Superintendent of the Jefferson, Delaware, Susquehanna and New York divisions, and finally Acting Chief Engineer. Later he was Superintendent of the Hartford division of the New York, New Haven & Hartford, and then became Superintendent of the Chicago & Alton Lines in Illinois. He was for a year General Superintendent of the Metropolitan Street Railway of New York. His salary is to be \$3,000.

G. F. Grattan, attorney for the Railroad Commission of Kansas, has filed with the commission a motion that it shall rescind the order issued by it about a year ago requiring an average reduction of 25 per cent. in freight rates in the state, and the board has acted favorably on the motion. The commission thus concedes the defeat of the state in the litigation in the Federal court growing out of the rate order referred to. Mr. Grattan gave two reasons for filing the motion. One was that the United States Circuit Court had indicated that the commission lacked jurisdiction to establish the jobbers' rates provided for in its order, and that the class and commodity rates provided for, without the jobbers' rates, would not be for the best interests of the state at large and would be especially injurious to its commercial interests. The second reason given was that after the decision of the court the commission presented to the legislature a schedule of reasonable maximum rates which was enacted into a law and which the railways have announced they will put into effect.

New York. Loading and Unloading Freight at Rochester.

Moseley & Motley Milling Co. et al. v. New York Central & Hudson River et al. Opinion by Commissioner Decker.

The long existing practice on the part of railways of having tallymen assist owners in loading and unloading carload pack-

age freight on the station team tracks was abrogated on January 1, 1909, by amendment of rule 8-B of the Official Classification which as amended reads: "Owners will be required to load and unload freight in carloads when carried at carload rates."

Prior to January 1 the rule read: "Owners will be required to load and unload freight in carloads, except that the carriers reserve the right to load and unload at their convenience."

The rule as amended was construed by the carriers to forbid such assistance in loading and unloading by tallymen. It appeared in the cases that the increased cost to shippers and consignees through forbidding assistance of the tallymen is large, while under the new rule the operating cost of the carriers is not materially diminished. Immediately after January 1 the carriers, because of competition or local conditions, put in exceptions at various large cities, including Buffalo, New York, Toledo, Cleveland, Cincinnati, Chicago, St. Louis, and also at Fulton, N. Y. Under these exceptions such assistance by tallymen is permitted or privileges respecting loading and unloading of equal or greater value are afforded. No such exceptions were put in effect at Rochester or Troy.

The commission holds that the former existing practice should be restored at Rochester and Troy. Such practice was merely an incidental modification of the carriers' rule requiring owners to load and unload carload freight, and it may be restored by suitable tariff or classification amendment without materially affecting general application of the rule itself. No important discrimination would result from a return to the old rule, and such rule would obviate both the present and future real discrimination caused by exceptions in force at designated cities, the discriminations resulting from probable non-observance in future of the present rule as construed by the carriers, and the present unnecessary and great aggregate cost laid upon shippers and consignees.

COURT NEWS.

Judge Trieber, of the Federal court, rendered a decision at Little Rock, Ark., on June 5 in the case of *Watson v. the St. Louis, Iron Mountain & Southern* sustaining the constitutionality of the employers' liability act, passed by Congress in 1908.

The United States Circuit Court at St. Louis issued an injunction on June 7 restraining the Interstate Commerce Commission from enforcing its order requiring the Northern Pacific to join with the Harriman lines in establishing a through route for passengers going to or from points on Puget Sound via Portland. The order of the commission is attacked upon the ground that reasonable through routes to Puget Sound already exist via the Hill lines.

In the United Circuit Court at New York City, June 4, Judge Lacombe made permanent the injunction, which was granted several months ago, forbidding the enforcement of the order of the Interstate Commerce Commission, directed to the Delaware, Lackawanna & Western, regulating the manner of dealing with carload shipments made up by a forwarding agent and consisting of numerous small shipments for different consignees. The complainant, the Export Shipping Co., appears to have gone into bankruptcy and to have neglected to appear in court. In default of such appearance the perpetual injunction was issued.

The report of the auditor appointed by the Supreme Court of Georgia holds that the full 5 per cent. interest on the second and third mortgage income bonds of the Central of Georgia was payable out of earnings of the fiscal year ended June 30, 1907. The report renders judgment in favor of bondholders for \$288,970 interest unpaid, since in 1907 but 3.729 per cent. was paid on the \$7,000,000 second income bonds and nothing on the \$4,000,000 third income bonds. The Central of Georgia controls, through ownership of the entire stock, the Ocean Steamship Co., and the auditor's report holds that the surplus earnings of this Ocean Steamship Co. should have been included as earnings available for payment of dividends on the income bonds. In the fiscal year ended June 30, 1908, no dividends were paid on these income bonds.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

D. A. Sortwell has been elected the President of the Barre Railroad, succeeding A. D. Morse, resigned.

O. H. Nance, Treasurer of the Trinity & Brazos Valley, has been appointed the Auditor of the St. Louis, Brownsville & Mexico, with office at Kingsville, succeeding W. I. Church, resigned.

Richard A. Jackson, President of the Rock Island Company and Vice-President of the Chicago, Rock Island & Pacific, has been elected also General Counsel of the Chicago, Rock Island & Pacific, General Counsel of the St. Louis & San Francisco, Vice-President of the Chicago & Eastern Illinois, and Vice-President of the Evansville & Terre Haute.

Operating Officers.

W. L. Derr has been appointed to a position under the New York Public Service Commission, as noted under State Commissions.

J. E. Thurston has been appointed Assistant Trainmaster of the Allegheny division of the Pennsylvania, with office at Oil City, Pa.

D. W. Orr has been appointed the Superintendent of the Arkansas River division of the Atchison, Topeka & Santa Fe, with office at La Junta, Colo., succeeding G. C. Starkweather, transferred.

W. F. Schaff, Trainmaster of the Cleveland, Cincinnati, Chicago & St. Louis at Cleveland, Ohio, has been appointed Assistant Superintendent of the Lake Shore & Michigan Southern at Cleveland, Ohio.

Charles W. Buchanan, Trainmaster of the Cleveland, Cincinnati, Chicago & St. Louis at Bellefontaine, Ohio, has been appointed Trainmaster at Cleveland, Ohio, succeeding W. F. Schaff, resigned to go with another road.

C. J. Larimer, Superintendent of the St. Louis Southwestern of Texas, has been appointed the Assistant Superintendent of the St. Louis, Brownsville & Mexico, with office at Gainesville, Tex. He succeeds P. J. Signor, who had the title of Trainmaster, and who resigned to engage in other business.

G. Davis, Superintendent of the Minnesota division of the Chicago, Rock Island & Pacific, has been appointed the Superintendent of the St. Louis division, with office at Eldon, Mo. W. H. Given, Superintendent of the Des Moines Valley division, succeeds Mr. Davis, with office at Cedar Rapids, Iowa. A. W. Kelso, Superintendent of the St. Louis division, succeeds Mr. Given, with office at Des Moines, Iowa.

The jurisdiction of W. T. Caldwell, Superintendent of the Cincinnati, New Orleans & Texas Pacific, with office at Danville, Ky., has been extended over the entire road. C. E. Rickey, Superintendent of the Cincinnati division, with office at Lexington, Ky., has been appointed the Superintendent of Terminals, with office at Cincinnati, Ohio, with jurisdiction from Cincinnati to Erlanger inclusive, and his former office has been abolished. He will report to the Superintendent.

The territory of C. T. Mason, Assistant Superintendent of the St. Louis & San Francisco at Amory, Miss., has been extended to include the entire Southeastern division from Memphis to Birmingham, exclusive of Birmingham Terminals and the Bessemer branch. J. F. Liston, formerly Chief Train Despatcher, has been appointed Trainmaster of Birmingham Terminals, including the Bessemer branch, with office at Birmingham, Ala. A. B. Woodward succeeds Mr. Liston as Chief Train Despatcher, with office at Birmingham.

Traffic Officers.

J. L. Hawley has been appointed the General Freight and Passenger Agent of the Gulf & Ship Island, with office at Gulfport, Miss. This is a new office.

Edward M. Horner has been appointed a District Passenger Agent of the Lehigh Valley, with office at Rochester, N. Y., succeeding George H. Harris, deceased.

A. P. Morrison, formerly chief clerk to the Passenger Traffic Manager of the Atchison, Topeka & Santa Fe, has been appointed an Assistant General Passenger Agent, with office in Chicago.

A. E. Buck, Commercial Agent of the St. Louis, Brownsville & Mexico at Houston, Tex., has been appointed a Traveling Freight Agent of the International & Great Northern, with office at Houston, Tex.

H. W. Steinhoff, formerly the Assistant General Passenger Agent of the Wisconsin Central, has been appointed the Michigan Passenger Agent of the Chicago, Milwaukee & St. Paul, with office at Detroit, Mich., succeeding Robert C. Jones, deceased.

H. C. Moran, Commercial Agent of the St. Louis, Brownsville & Mexico at Corpus Christi, Tex., has been appointed a Commercial Agent, with office at Houston, Tex., succeeding A. E. Buck, resigned to enter the service of another road. H. J. Neff, formerly Traveling Freight Agent of the Trinity & Brazos Valley, succeeds Mr. Moran.

Robert N. Collyer, whose election as Chairman of the Committee on Uniform Classification has already been announced in these columns, was born on October 8, 1866, at Stockton, Eng. He received his education in the grammar schools in Bayonne, N. J., and began railway work on August 11, 1881, in New York, with the "Bee Line," now part of the Cleveland, Cincinnati, Chicago & St. Louis. He was in the passenger department of this road until 1885, when he entered the freight department of the Chicago, Burlington & Quincy as a clerk, and served successively as Traveling Freight Agent and Contracting Agent. In 1889 he became city freight agent and Assistant General Eastern Agent of the Wabash at New York.

In 1899 he became Division Freight Agent at Detroit. In 1906 he became General Agent at Buffalo and in 1907 was appointed Assistant General Freight Agent at St. Louis. He left the service of the Wabash in 1908 to become a member of the Committee on Uniform Classification, being one of the representatives of the Official Classification lines.

Engineering and Rolling Stock Officers.

T. H. Kruttschnitt has been appointed an Assistant Roadmaster of the Siskyou district of the Shasta division of the Southern Pacific, with office at Weed, Cal.

H. A. Genung, Roadmaster of the International & Great Northern, has been appointed the Engineer in charge of Maintenance of Way and Water Service, with office at San Antonio, Tex.

E. W. Holmes has been appointed the Master Carpenter of the Allegheny division of the Pennsylvania, with office at Oil City, Pa., succeeding J. Leibengood, assigned to other duties.

R. G. Turnbull has been appointed a Master Mechanic of the Missouri Pacific, the St. Louis, Iron Mountain & Southern and leased, operated and independent lines, with office at Osawatomie, Kan., succeeding M. M. Myers, resigned.

T. F. Carberry, Master Mechanic of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, at Fort Scott,



Robert N. Collyer.

Kan., has been appointed the General Foreman of the shops of these roads, with office at St. Louis, Mo.

G. W. Robb, Assistant Master Mechanic Grand Trunk Pacific at Rivers, Man., has been appointed Master Mechanic, in charge of Motive Power, Cars and Shops, with office at Rivers, succeeding Wm. Gell, resigned on account of ill health.

Henry Montgomery has been appointed the Master Mechanic of the Allegheny division of the Pennsylvania, with office at Oil City, Pa. H. R. Brigham has been appointed the Road Foreman of Engines of the Buffalo division, with office at Buffalo, N. Y., succeeding G. O. Taylerson, assigned to other duties.

C. E. Chambers, Division Master Mechanic of the Central of New Jersey at Ashley, Pa., has been appointed the General Master Mechanic and will have charge of the assignment of motive power over the entire system and perform such other duties as may be assigned to him by the Superintendent of Motive Power. Roundhouse foremen, road foremen and traveling firemen will report to him direct.

The jurisdiction of T. O. Sechrist, Master Mechanic, with office at Ferguson shops, Ferguson, Ky., has been extended over the entire Cincinnati, New Orleans & Texas Pacific. J. H. Murphy, the Master Mechanic at Ludlow, Ky., has been appointed the General Foreman at Ludlow shops, with jurisdiction over the Mechanical department forces from Cincinnati to Lexington, inclusive, and his former office has been abolished.

H. E. Warrington, Chief Engineer of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, having resigned, the office of Chief Engineer is abolished. Curtis Dougherty has been appointed the Engineer Maintenance of Way, with office at Cincinnati, reporting to the General Manager. B. Herman has been appointed the Engineer of Bridges, with office at Cincinnati, reporting to the Engineer Maintenance of Way.

OBITUARY.

Arthur Murphy, Supervisor of the Louisville division of the Illinois Central, died June 1 at Central City, Ky., after an illness of several months.

Madison M. Hurley, General Southern Agent of the Star Union Fast Freight Line of the Pennsylvania, died at Louisville, Ky., June 1, from heart disease.

Charles W. Douglass, formerly a Superintendent of the Delaware division of the Erie and later Superintendent of the South Side Railroad of Long Island, died at Wayne, N. J., on May 31.

James A. Richmond, formerly president of the Broadway Surface Railway of New York, and for a number of years prominent in the traction affairs of New York, died in Paris, France, on June 8.

John Elphick, who died at Poolville, Madison county, N. Y., May 5, at the age of 97, is spoken of as the first railway brakeman in the United States. He worked for the Mohawk & Hudson, running between Albany and Schenectady, and began work in October, 1830. From an article in the *Utica Saturday Globe* of May 15, which appears to be based on authentic information obtained from Mr. Elphick's daughter, it appears that he came from England to this country in the spring of 1830. His first work on the Mohawk & Hudson was for the contractors who were building the road. As a laborer here his pay was 37½ cents a day; the foreman of the gang receiving 50 cents. At that time they worked 12 hours a day. Elphick was the brakeman on the first passenger train that was run—the train which has been made a familiar sight everywhere by the widely published picture of it, purporting to show it on the day of the opening excursion (1831), and by the full-size models of the engine and cars, which were built by the New York Central in 1893 and exhibited at the World's Fair in Chicago that year. Elphick soon after went to work on the Chenango canal, and it does not appear that he was ever again in the railway service.

Railroad Construction.

New Incorporations, Surveys, Etc.

ADA TERMINAL.—Organized in Oklahoma, with \$30,000 capital, to build a terminal line from the Oklahoma Central into the city of Ada, Okla. The incorporators include D. Carter, Pursell, Okla.; T. Hope, A. K. Thornton and A. L. Beck, of Ada; H. P. Douglas and P. A. Morris, of Shawnee.

ALGOMA CENTRAL & HUDSON BAY.—Sealed bids will be received until June 15 by C. N. Coburn, Ch. Engr., for clearing, grading and ballasting eight miles of the Manitoulin & North Shore.

ARIZONA & SWANSEA.—Incorporated in Arizona, with \$500,000 capital, to build from a point on the Arizona & California, near Bouse, Ariz., to the new mining camp of Swansea, where the Clara Consolidated Mining Company's property is being developed. The incorporators include G. Mitchell, T. J. Carrigan and E. D. Olsen, of Los Angeles, Cal.; R. E. Morrison and A. Hill, of Prescott, Ariz.

ATCHISON, TOPEKA & SANTA FE.—This company is planning to build 600 miles of new line and to spend a large amount of money on extensions, repairs, improvements, ballasting and new steel within the next few years.

CANADIAN NORTHERN.—William Mackenzie, Pres., is reported to have said that during the present year the company will build 1,500 miles of line in Alberta and Saskatchewan, 600 miles in Ontario and 200 miles in Manitoba.

CHAMPLAIN & SANFORD.—The New York Public Service Commission, Second district, has granted the application for a change of motive power and route. The road may now be operated with either electrical power or oil-burning locomotives. (May 14, p. 1051.)

DENVER & RIO GRANDE.—Press reports from Salt Lake City, Utah, indicate that this company will soon ask bids for double-tracking the line between Colton, Utah, and Nolan, seven miles.

GILMORE & PITTSBURGH.—An officer writes that the route of this line will be from Armstead, Mont., west via Grant to Junction, Idaho, with a branch from Junction northwest to Salmon and another southeast to Gilmore. Work is under way by MacArthur Brothers Construction Co., New York. (Jan. 29, page 235.)

GRAND TRUNK PACIFIC.—President Charles M. Hays is quoted as saying that the western end of the line is to be opened for operation by September 1 on 1,365 miles, from Fort William, Ont., west to the end of the prairie section at Wolf creek, which is 120 miles west of Edmonton, Alb. A mixed train service is now in operation from Winnipeg, Man., west for 700 miles. It is expected that the first 100 miles from the western terminus at Prince Rupert, B. C., east to the Copper river will be opened about October 1.

Announcement is expected within a few days as to the successful bidder for the branch from Melville, Sask., north to Yorktown, 40 miles; also regarding the contract for the branch from Biggar, Sask., north to Battleford, 35 miles. Bids are about to be asked for the branch from Melville, Sask., southwest to Regina, 25 miles. (May 7, p. 1007.)

HUDSON & MANHATTAN.—The Board of Estimate and Apportionment has approved the extension of this company's subway, from Thirty-third street and Sixth avenue, Borough of Manhattan, New York City, to the Grand Central Station at Forty-second street. Work can be started as soon as the necessary consents of property owners are obtained. (May 7, p. 1007.)

INDIANAPOLIS UNION RAILWAY.—Contracts are said to have been let to the McClintic-Marshall Construction Co., New York, for the work of elevating this company's tracks at East Washington street. Contract price is said to be \$153,000.

LEXINGTON & INTERURBAN.—This company has sold notes to finance the extension being built from Lexington, Ky., south to Nicholasville, 20 miles.

MANITOULIN & NORTH SHORE.—See Algoma Central & Hudson Bay.

MARSHALL & EAST TEXAS.—An officer writes that location has been made for 12 miles on the extension projected from Marshall, Tex., south. Grading has been finished on five miles and two miles of track are laid. Grading is well advanced on the remaining seven miles and track laying is being pushed. The line is being built with 65-lb. rails, rolled by the Illinois Steel Co., and there are 3,040 white oak ties being laid to the mile. The frogs and switches are being furnished by the St. Louis Frog & Switch Co. Maximum grade is $\frac{5}{10}$ per cent. and maximum curvature 4 deg. (May 28, p. 1144.)

MINIDOKA & SOUTHWESTERN.—See Oregon Short Line.

OREGON SHORT LINE.—According to press reports a map has been filed of the projected branch from Twin Falls, Idaho, south to the Southern Pacific main line near Cobre, Nev., about 120 miles. Construction work is under way. The Minidoka & Southwestern amended its charter to cover this survey. (March 19, p. 656.)

PARAGOULD & MEMPHIS.—An officer writes that this company is now operating a line from Cardwell, Mo., east thence south to Manila, Ark., 21.29 miles; also from Cardwell south to Macey, Ark. A line is being built west by the company's men, on which about six miles are yet to be built to reach Paragould, Ark.

PECOS VALLEY SOUTHERN.—Incorporated in Texas, with \$45,000 capital, with headquarters at Pecos, in Reeves county. The incorporators include J. F. McKenzie, J. G. Love, F. W. Johnson, M. L. Swinehart, W. D. Cowan, B. R. Stine and W. P. Brady, of Pecos; H. Robbins, of Saragosa; C. W. Griffin, of Toyahvale, and E. D. Balcome, of Balmorhea.

ROGERS, PEA RIDGE & NORTHERN INTERURBAN.—An officer writes that franchises have been secured, preliminary surveys made and work is now under way. The projected route is from the electric springs in the suburbs of Rogers, Ark., via Rogers, north to Pea Ridge, 11 miles, thence east six miles to the Elkhorn battlefields. A. R. Potter, Pres., Rogers. (May 28, p. 1145.)

ROME & NORTHERN.—Contract is said to have been given to Burke & Joseph, of Cape Girardeau, Mo., to build from Rome, Ga., north to Gore, 10 miles. The line is projected north to the Tennessee state line, a total of about 80 miles. H. M. Smith, Ch. Engr., Rome, Ga. (June 4, p. 1187.)

ST. LOUIS, OKLAHOMA & TEXAS.—According to reports, M. J. Healy, Commercial Club, Tyler, Tex., wants to hear from construction companies and contractors who will furnish bond for \$100,000 to build the first section of 30 miles from Tyler, Tex., north. M. J. Smith, Ch. Engr., McAlester, Okla. (May 7, p. 1008.)

SAN DIEGO & ARIZONA.—According to press reports construction work has been started on the first section from San Diego, Cal., south. E. J. Kallright, Ch. Engr., Union building, San Diego. (May 21, p. 1099.)

SOUTHERN PACIFIC.—See Oregon Short Line.

TEXAS ROADS.—According to press reports, the North & South Railway Promotion Co., of which W. M. Fly, of Gonzales, Tex., is president, and W. C. Barrickman, of Cuero, is secretary, has been organized to confer with committees from the various counties to secure the building of a line north from Aransas Pass, Tex., to a connection either with the Missouri, Kansas & Texas at Smithville or the Gulf, Colorado & Santa Fe at Somerville. Surveys are to be started at once. It is said that two construction companies are willing to build the line. About \$100,000 is already available to carry out the project.

WEST POINT & HOUSTON.—An officer writes that the route of this road will be from West Point, Miss., northwest via Abbott and Caradine to Houston, 30 miles. The company is also considering a route from Caradine to Woodland, 8.5 miles south of Houston, thence to Hohenlinden and Calhoun City. This latter route will make a line 50 miles long. J. A. MacArthur, Pres., West Point, Miss. (June 4, p. 1187.)

Railroad Financial News.

ATCHISON, TOPEKA & SANTA FE.—The new convertible 4 per cent. bonds offered to stockholders to the extent of 12 per cent. of their holdings (June 4, page 1188) have been underwritten by J. P. Morgan & Co. The bonds mature June 1, 1959, and are convertible prior to June 1, 1918, into common stock at par. The new issue, which is part of an authorized issue of \$98,000,000, of which \$26,056,000 are outstanding, is limited to \$35,000,000. Only \$26,377,000 is needed to supply stockholders on the basis of 12 per cent. of their holdings, but since the convertible bonds formerly issued may be converted into stock and the rights thus acquired be used to subscribe for additional new bonds, the company has provided sufficient bonds to meet this possibility.

BERKELEY SPRINGS & POTOMAC.—The property of this company, whose road runs from Berkeley Springs, W. Va., to Hancock Station, six miles, has been ordered sold within 30 days from May 11 unless a judgment in favor of the Baltimore & Ohio for \$129,853 is paid. The road has been operated as a branch of the B. & O.

BOSTON & MAINE.—See New York, New Haven & Hartford, and see also an item in regard to this company in Court News.

CENTRAL OF GEORGIA.—See an item in regard to this company under Court News.

CHESAPEAKE & OHIO.—See Chicago, Cincinnati & Louisville.

CHICAGO & ALTON.—See Kansas City, Mexico & Orient and also Chicago, Cincinnati & Louisville.

CHICAGO, CINCINNATI & LOUISVILLE.—Reports say that the Hawley interests, which recently acquired control of the Chesapeake & Ohio, and which also control the Chicago & Alton and the Toledo, St. Louis & Western, have bought a large amount of the securities of the C. C. & L., which is now in the hands of a receiver. It is said that when the road is recognized it will be used as a connecting link between the Chesapeake & Ohio and the Chicago end of the Clover Leaf-Alton system.

CHICAGO GREAT WESTERN.—Blair & Co., New York, are buying at par the coupons due June 1 on the first mortgage 4 per cent. bonds (12,000,000 outstanding) of the Mason City & Fort Dodge. The M. C. & F. D. is controlled through ownership of the entire stock by the Chicago Great Western and its property is leased for 100 years to the Chicago Great Western on the basis of a guarantee of interest payments on the bonds and preferred stock, any surplus earnings being held in trust by the C. G. W. for the payment of future interest coupons.

CHICAGO, INDIANA & ST. LOUIS.—A semi-annual dividend of 1 $\frac{1}{2}$ per cent. was declared on June 3 on the common stock. This is at the rate of 3 $\frac{1}{2}$ per cent. annually as compared with 3 per cent. paid annually from 1905 to 1908 inclusive. The regular dividend of 2 per cent. on the \$5,000,000 preferred stock was also declared. The Louisville & Nashville and the Southern Railway own 93 per cent. of the common stock and 77 per cent. of the preferred stock, which has been deposited as security for joint collateral trust bonds.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has bought the property of the Yellowstone Park Railway, which enters the park by way of Clark's Ford and runs to Bridger, 30 miles.

GALVESTON, HARRISBURG & SAN ANTONIO.—The Southern Pacific has been made a party to the suit brought by certain holders of the \$6,354,000 Western division second mortgage (income bonds) of the Galveston, Harrisburg & San Antonio to foreclose the mortgage because of failure to pay interest thereon. No decision as to the merits of this suit itself has been rendered as yet.

KANSAS CITY, MEXICO & ORIENT.—A traffic arrangement has been made between this company and the Chicago & Alton for an interchange of freight and passengers and the running of through trains over the Chicago & Alton and the

Kansas City, Mexico & Orient. Reference to this agreement is made in the editorial columns of this issue.

KANSAS CITY SOUTHERN.—Stockholders are offered the privilege of subscribing at par until June 24 for \$10,000,000 proposed new refunding and improvement bonds to the extent of 19.60 per cent. of their holdings. (May 7, page 1009.) The proceeds of the bonds are to be used as follows:

1. To pay off the collateral gold note on July 1, 1909	\$5,100,000
2. To reducing grades to $\frac{1}{2}$ per cent. on three full operating divisions, aggregating 41 per cent. of the total length of the line	1,250,000
3. To rearranging four division terminals to permit of better and more economical operation under the 16-hr. law, and to provide more adequate facilities for taking care of the power and traffic	1,000,000
4. To ditching, ballasting, new rail, improvements to track and bridges	1,000,000
5. The balance to be used for the improvement of terminal facilities at Kansas City and Port Arthur; for facilities for securing new business and for other corporate purposes	1,275,000

Total \$9,625,000
The bonds have been underwritten by Ladenburg, Thalmann & Co., New York.

METROPOLITAN STREET RAILWAY (NEW YORK).—The receivers of the New York City Railway and the Metropolitan Street Railway have sold to the Central Trust Co. and Wm. A. Read & Co., both of New York, a new issue of \$3,500,000 4 1/2 per cent. receivers' certificates due June 15, 1910, the proceeds to be used to take up \$3,500,000 5 per cent. receivers' certificates issued in 1908 and due June 15, 1909.

MISSOURI PACIFIC.—Stockholders are to vote on August 6 on the proposal to consolidate the following companies, whose properties make the Missouri Pacific system exclusive of the St. Louis, Iron Mountain & Southern:

Missouri Pacific.	Fort Scott Central.
Kansas & Colorado Pacific.	Kanopolis & Kansas Central.
Central Branch.	Kansas Southwestern.
Rooks County.	Leroy & Caney Valley Air Line.
Nevada & Minden.	Kansas City & Southwestern.
Nevada & Minden of Kansas	

The proposed new corporation will be the Missouri Pacific Railway Co.

NATIONAL RAILWAYS OF MEXICO.—Kuhn, Loeb & Co., Ladenburg, Thalmann & Co., Speyer & Co. and Hallgarten & Co., all of New York, have prepared a circular describing the \$24,000,000 prior lien 4 1/2 per cent. sinking fund bonds of 1907-1957 of the National Railways of Mexico which they are offering at 95. The circular describes the purpose of the issue and the security behind the bonds.

NEW YORK CITY RAILWAY.—See Metropolitan Street Railway.

NEW YORK, NEW HAVEN & HARTFORD.—The bill permitting the incorporation of the John L. Billard Co. to take over the Boston & Maine stock owned by Mr. Billard has been passed by the house of representatives of Connecticut. This stock was acquired by Mr. Billard from the New York, New Haven & Hartford. See item in regard to Boston & Maine in Court News.

ST. LOUIS SOUTHWESTERN.—Directors have declared an initial dividend (semi-annual) of 2 per cent. on the \$19,890,000 outstanding 5 per cent. non-cumulative preferred stock.

SOUTHERN PACIFIC.—The directors have authorized the issue of 100,000,000 4 1/2 per cent. 20 year bonds or debentures.

The outstanding preferred stock (\$74,863,400) has been called for redemption on July 15. Holders of the preferred stock have the privilege of:

(1) Exchanging their stock for new 4 1/2 per cent. bonds at par and receiving in addition \$20 per share in cash. [This means that a holder of ten shares of stock will receive in exchange a \$1,000 bond and \$200 in cash.] Or,

(2) Of converting their stock into common stock at par; or

(3) Of surrendering their stock and receiving \$115 cash per share.

Since both the common stock and the preferred stock are at present selling above 130, preferred stock owners will, it would seem likely, either exchange their stock for new bonds or for common stock. The preferred stock has been paying 7 per cent. dividends and the common stock is paying 6 per cent. dividends. See Galveston, Harrisburg & San Antonio.

YELLOWSTONE PARK RAILWAY.—See Chicago, Milwaukee & St. Paul.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Austrian State Railways will soon ask bids on about 150 locomotives.

The Mobile, Jackson & Kansas City is said to be in the market for locomotives. This item is not confirmed.

The Tientsin Pukow, T. K. Tow, Imperial Chinese Telegraphs, The Bund, Shanghai, is asking bids on mogul locomotives up to June 29.

The Texas Central has ordered three 10-wheel passenger locomotives, cylinders 18 in. x 24 in., total weight 130,000 lbs., from the American Locomotive Co.

The New Canadian Company has ordered two 10-wheel freight locomotives, cylinders 18 in. x 24 in., total weight 109,000 lbs., from the American Locomotive Co.

The Kansas City, Mexico & Orient has ordered from the American Locomotive Co. five consolidation locomotives, cylinders 22 in. x 30 in., total weight 207,000 lbs., and four six-wheel switchers, cylinders 19 in. x 26 in., total weight 139,000 lbs.

CAR BUILDING.

The Rio Grande & Eagle Pass is in the market for 20 freight cars.

The St. Louis & San Francisco has ordered 250 fifty-ton oil tank cars.

The Northern Pacific is in the market for from 1,000 to 2,000 box cars.

The Lehigh Valley has ordered 155 all-steel coaches from the Standard Steel Car Co.

The Northern Pacific is said to have ordered 70 steel passenger cars. This item is not yet confirmed.

The Mobile, Jackson & Kansas City is said to be in the market for cars. This item is not confirmed.

The Northwestern Elevated, Chicago, is said to be in the market for 20 cars. This is not yet confirmed.

The Chicago & North Western is said to have ordered 100 steel passenger cars. This is not yet confirmed.

The Harriman Lines are in the market for from 5,000 to 6,000 freight cars, including a number of box cars.

The Austrian State Railways will soon ask bids on about 384 passenger cars, 190 service cars and 1,365 freight cars.

The Argentine Government Railways ask bids up to June 26 on 35 tank cars, and up to July 1 on 190 flat cars, 35 tank cars and 30 covered trucks.

The Canadian Pacific will build 4 store supply cars, 2 horse cars, 54 box, 1 stock and 1 Hart ballast car at its Angus shops and 32 vans at its Farnham shops.

The Canadian Northern is said to have ordered 27 refrigerator and 100 flat cars from the Crossen Car Manufacturing Co. This item is not yet confirmed.

The Puget Sound (Electric), through the Stone & Webster Engineering Corporation, Boston, Mass., is in the market for one 55-ft. motor car and one 55-ft. trail parlor car.

The Chicago Railways Co., reported in the *Railroad Age Gazette* of February 12 as being in the market for 350 pay-as-you-enter cars, has ordered them from the Pullman Co., including trucks.

The Chicago, Rock Island & Pacific is in the market for 69 passenger cars. These cars will be duplicates of those ordered some months ago, as reported in the *Railroad Age Gazette* of February 12.

The Fort Worth-Dallas Interurban is soon to draw up specifications on four interurban car bodies. The equipment will be bought through the Stone & Webster Engineering Corporation, Boston, Mass.

The Tacoma Railway & Power Co. is soon to draw up specifications for four large combination city cars. The equipment will be bought through the Stone & Webster Engineering Corporation, Boston, Mass.

The Pennsylvania is said to be in the market for 1,000 freight cars and 214 passenger cars, in addition to the 121 passenger cars mentioned in the *Railroad Age Gazette* of June 4. This item is not yet confirmed.

The Interborough Rapid Transit has placed contracts for the 100 elevated cars, mentioned in the *Railroad Age Gazette* of May 14, as follows: Barney & Smith Car Co., 40; Wason Manufacturing Co., 20; St. Louis Car Co., 20, and Jewett Car Co., 20.

The St. Louis & San Francisco, reported in the *Railroad Age Gazette* of May 28 as being in the market for 60 coaches, has ordered 10 coaches, 70 ft. long; 10 baggage cars, 66 ft. long, and 10 chair cars, 70 ft. long, from the American Car & Foundry Co. All will have six-wheel trucks.

The Northern Texas Traction Co., Fort Worth, Tex., has ordered through the Stone & Webster Engineering Corporation, Boston, Mass., twelve 28-ft. closed car bodies and one 21-ft. closed car body from the Cincinnati Car Co. The larger cars will have Standard Motor Truck Company's trucks and four-motor General Electric equipments and air-brakes.

The Western Pacific has ordered from the American Car & Foundry Co. 1,500 forty-ton box cars, 250 fifty-ton flat cars and 500 forty-ton stock cars, mentioned in the *Railroad Age Gazette* of May 21, and 60 caboose cars from the Haskell & Barker Car Co. The road may place orders for 200 refrigerator cars. Contracts for passenger equipment are not yet closed.

The Houston Electric Co., Houston Tex., has ordered through the Stone & Webster Engineering Corporation, Boston, Mass., five double-end and 15 single-end 21-ft. closed car bodies from the Cincinnati Car Co. The double-end cars will have Standard Motor Truck Company's single trucks and the other cars will have Brill trucks. They will be equipped with two-motor General Electric equipments.

The Lehigh Coal & Navigation Co. has ordered from the Standard Steel Car Co., for July delivery, the 35 fifty-ton steel coal cars, mentioned in the *Railroad Age Gazette* of June 4. These cars will measure 30 ft. long, 9 ft. 5½ in. wide, 6 ft. 10¼ in. high, inside measurements, and 31 ft. 6 in. long, 10 ft. wide, 12 ft. high, over all. The special equipment includes:

Axes	Steel
Bolsters, truck	Gould
Brakes	Westinghouse
Brake-beams	Davis
Brake-shoes	Am. Brake-Shoe & Fdy. Co.
Couplers	Gould
Doors	Drop
Journal boxes	Gould
Paint	Nobrac
Springs	Union Spring & Mfg. Co.

IRON AND STEEL.

The Northern Pacific is in the market for about 15,000 tons of rails.

The Mobile, Jackson & Kansas City is reported in the market for rails.

The Isthmian Canal Commission asks bids up to June 21 on 25 split switches for 70-lb. rail. (Circular No. 514.)

The South American Road is about to order 12,000 tons of 60-lb. rails. (Inquiry No. 3484, Bureau of Manufactures, Washington, D. C.).

The Grand Trunk has ordered 700 tons of structural steel from the Pennsylvania Steel Co. and 1,400 tons from the Wisconsin Bridge Co.

A European State Railway will soon ask bids for rails for several hundred miles of road. Some of them may be bought in the United States. (Inquiry 3468, Bureau of Manufactures, Washington, D. C.).

The Tientsin-Pukow Railway, China, is asking bids on 321 spans of deck girders and five spans of through girders. Inquiries will be received by Baker & Hurtzig, 2 Queen Anne's Mansion, Westminster, S. W., England.

General Conditions in Steel.—Current reports indicate an increasing activity in all finished steel products. Numerous small orders have made a heavy aggregate, but probably not up to the accustomed May transactions. It is said that car shops and locomotive builders are specifying more freely on contracts for shapes and plates and are also making considerable purchases to cover prospective business. The present activity in railway equipment orders will undoubtedly result in increased operations at the steel mills. The Pennsylvania Steel Company is said to have announced that the wage scales at its various plants, which were cut 10 per cent. on April 1, will be restored in all departments from July 1. This order will affect 7,000 men.

RAILROAD STRUCTURES.

ALAMOSA, COLO.—The Denver & Rio Grande is building new shops. They will be of brick and concrete and 115 ft. x 351 ft. A freight house 30 ft. x 100 ft., oil house 30 ft. x 30 ft., and office and store house 40 ft. x 150 ft. also will be built. The new passenger depot has been completed at a cost of \$16,000.

BLOOMINGTON, IND.—The Chicago, Indianapolis & Louisville has given a contract to the Strobel Steel Construction Co., Chicago, for the steel work on 10 bridges to be built near Bloomington, Ind.

BROWNSVILLE, TEX.—According to press reports the United States War Department has authorized the building of the bridge across the Rio Grande river and the work of construction will now be rushed. The bridge is to be built jointly by the St. Louis, Brownsville & Mexico and the National Railways of Mexico; contract for the substructure let to the Foundation Company, New York, and for the superstructure to the Wisconsin Bridge & Iron Company, North Milwaukee, Wis. (March 12, p. 528.)

CAYUGA, N. Y.—See Geneva, Waterloo, Seneca Falls & Cayuga Lake under Railroad Construction.

CHICAGO, ILL.—The Chicago & Western Indiana is receiving bids for the construction of a steel bascule bridge over the Calumet river.

The Chicago & Western Indiana and the Belt Railway will build stockyards occupying about three acres of land at Seventy-fifth and Rockwell streets in order to provide a place where cattle in transit to the union stockyards can be unloaded, fed and watered, and violations of the federal 28-hour law thereby avoided.

HOUSTON, TEXAS.—The Houston Belt & Terminal Co. has adopted plans by Warren & Wetmore, New York, for a passenger terminal and station and will begin building at once. The structure will be three stories high, foundation to be capable of supporting an eight-story building 250 ft. long. The train sheds will provide for six tracks. The total cost will be \$475,000. In connection with the station the company will build a roundhouse, machine shops and an electric light plant for lighting both passenger and freight terminals. (Feb. 12, p. 334.)

INDIANAPOLIS, IND.—The Belt Railway has given the contracts for the steel and concrete work in connection with the elevation of the Belt tracks. The steel contract was given to the McClintic-Marshall Construction Co., New York, and the concrete work to the American Construction Co., Indianapolis, Ind. The structure will provide for six tracks.

NEW ORLEANS, LA.—The Railroad Commission of Louisiana has ordered the Texas & Pacific to build in New Orleans east of the Mississippi river at some point convenient to the traveling public a comfortable and modern passenger depot.

The company must file plans for the proposed depot for the approval of the commission before June 27.

NEW YORK.—The Interborough Rapid Transit Co. has filed plans for a new car inspection shed for the Manhattan Railway branch at the corner of Third avenue and 129th street. The building will be 53 ft. x 440 ft. and will cost about \$20,000.

NORTH YAKIMA, WASH.—Bids are being asked on the new \$75,000 passenger station of the Northern Pacific. (Aug. 28, p. 829.)

QUEBEC, QUE.—According to a semi-official announcement from Ottawa the engineering commission appointed by the government to prepare plans for rebuilding the Quebec bridge has completed these plans. Should these be approved bids may be asked and the contract let at an early date. It is stated that the present piers, which cost \$1,500,000, will be utilized for the new bridge. It will have a span almost as great as the 1,800-ft. span of the wrecked bridge. The present piers will probably be duplicated on the river side, thereby reducing the central span to about 1,600 ft. The structure will be on the cantilever principle, and will be built of nickel steel. (Aug. 21, p. 782.)

REGINA, SASK.—The city and the Canadian Pacific have agreed regarding the building of a concrete subway under the company's tracks. The estimated cost is \$160,000.

SAN ANTONIO, TEX.—The San Antonio & Aransas Pass will build a passenger station.

SAUK CITY, WIS.—The Chicago, Milwaukee & St. Paul will build a new steel bridge across the Wisconsin river.

SPOKANE, WASH.—The Chicago, Milwaukee & Puget Sound will replace a number of temporary wooden bridges with steel and concrete arches.

TORONTO, ONT.—The Canadian Board of Railway Commissioners has decided that the Canadian Pacific and the Grand Trunk must, within two years, build a four-track viaduct across the water front at Toronto. The former company is ordered to elevate its two passenger tracks from Berkeley street to Queen street and to build a bridge at Easton avenue. Bridges must also be built at John street and Spadina avenue, over the viaduct tracks. It is provided that no damages are to be paid to the city for property taken or injured by building the viaduct, and for all damages to land other than that of the city and the railway companies, the city must pay one-third and the companies the remainder. The city is also ordered to pay one-third of the cost of building the viaduct and of the track elevation, the erection of bridges at John street and Spadina avenue, and the sub-structure for the elevation of the tracks at the proposed new union station. The City Engineer of Toronto estimates the cost of the viaduct, exclusive of the union station, at \$2,000,000. The railway companies estimated the union station to cost about \$2,000,000. It is understood that the railway companies will contest the right of the commission to enforce them to elevate their tracks.

TYLER, TEX.—The St. Louis Southwestern is having plans made for the enlargement and improvement of its machine shops and the installing of new machinery.

TWO HARBORS, MINN.—The Duluth & Northern Minnesota has given a contract for the building of new docks at Knife river, to cost about \$40,000, to Barnett & Record, Minneapolis, Minn.

WELLINGTON, KAN.—The Atchison, Topeka & Santa Fe has authorized to be built, as an addition to its terminal and repair plant, a new car shop 60 ft. x 100 ft., also a new power and blacksmith shop.

SIGNALING.

The electric train staff is now in use on the Bessemer & Lake Erie between Horne, Pa., and Black's Run. These stations are about three-fourths of a mile apart, and between them runs the Allegheny river, across which the railway is carried on a bridge 3,700 ft. long and 169 ft. high.

Supply Trade News.

The Cardwell Manufacturing Co., Chicago, has had its draft gear specified for the 3,000 cars ordered by the New York Central Lines.

George L. Wall, who has been Mechanical Engineer of the Lima Locomotive & Machine Co., Lima, Ohio, was appointed Assistant General Manager on June 1.

Franklyn M. Nicholl, formerly St. Louis, Mo., representative of the O. M. Edwards Co., Syracuse, N. Y., has become a traveling representative of the Dayton Manufacturing Co., Dayton, Ohio.

The Inter-Ocean Steel Co., Chicago Heights, Ill., has let contracts said to aggregate \$500,000 to the Cambria Steel Co., Philadelphia, Pa., and other Pennsylvania concerns for equipping the plant.

The New York Central Lines have specified Andrews side-frames for 3,000 cars ordered from the American Car & Foundry Co., Simplex couplers on 1,000 of the same lot and American Steel Foundries' cast-steel truck bolsters on 1,500.

The Chancery Division has decided in favor of the British Westinghouse Electric & Manufacturing Co., Ltd., Trafford Park, Manchester, England, the appeal from the decision of the Controller of Patents, who had revoked the Westinghouse company's patents for the manufacture of Bremer arc lamps in England.

The Isthmian Canal Commission asks bids up to July 19 on machinery for a central pumping station, including centrifugal pumps, pipe, motors, engines, boilers, etc. (Circular No. 516). Bids are asked until June 21 on pumps, hose, valves, packing, belting, switches, lubricators, one lathe and miscellaneous machinists' supplies. (Circular No. 514.)

J. W. Cowper, for a number of years with James Stewart & Co., general contractors, has severed his connection with that firm and is now Vice-President of the Worden-Allen Co., 115 Adams street, Chicago, general contractors for fireproof construction and manufacturers of steel construction. The shops of this firm are at Milwaukee, Wis., and Buffalo, N. Y.

The Barney & Smith Car Co., Dayton, Ohio, held its annual meeting June 1. All the old directors were re-elected with the exception of Colonel J. D. Platt, who retired and who was succeeded by his son, Frank Platt. A. M. Kittredge was elected President; H. M. Estabrook, Vice-President and General Manager; J. F. Kiefabar, Secretary and Treasurer, and E. A. Oblinger, Assistant Secretary and Treasurer.

The Atlas Locomotive Ashpan Co., Fort Wayne, Ind., has been incorporated with \$200,000 capital to make and sell a locomotive ashpan invented by J. A. Schwartz and T. P. Whelan, two New York, Chicago & St. Louis enginemen. The pan is said to be in use on New York, Chicago & St. Louis engines and to be adapted to any style of engine. The incorporators are: N. C. Meyers, H. O. Cowing, L. E. Merriman, J. A. Schwartz and T. P. Whelan.

Irving Loveridge, General Superintendent in Europe of the Western Electric Co., Chicago, died on June 3 in Berlin. Mr. Loveridge was 48 years old. He graduated from the University of Rochester in 1882 and at once went into the Western Electric Co. By 1892 he was performing the duties of purchasing agent, and at that time he was sent to Antwerp, Belgium. In 1906 he was made manager of the London branch and a few months ago was promoted to the position he held at the time of his death.

The Stoever Foundry & Manufacturing Co., Myerstown, Pa., with sales office at 140 Cedar street, New York, reports the sale of 12 No. 12 type H pipe-threading and cutting-off machines, motor-driven, capacity 4 in. to 12 in., to Spang, Chalfant & Co., Pittsburgh, Pa., for equipment of their new mill. This order was received through the Pittsburgh agents, the Brown & Zortman Machinery Co. The Stoever company advises that it is running full at the factory and has very few, if any, machines in stock.

The Gulick-Henderson Co., Pittsburgh, Pa., Inspecting Engi-

neers, has retained Samuel E. Duff, Empire building, Pittsburgh, Pa., to advise and direct its inspectors in matters of engineering, erection and fabricating shop methods. Mr. Duff will continue his general engineering practice and will also be represented at the Chicago and New York offices of the Gulick-Henderson Co. The company has opened an office in New York at 30 Church street. Henry Gulick will have direct charge of the office and will be assisted by T. W. Cohill.

The capital of the Baldwin Locomotive Works, application for charter for which will be made to Gov. Stuart, of Pennsylvania, on June 3, will be \$20,000,000, all in one class of stock. The new company, which will take the place of the unlimited partnership of Burnham, Williams & Co., Philadelphia, Pa., will have no bonded debt. The stock will be entirely held by the present members of the firm, who will constitute the new directorate. They are: George Burnham, John H. Converse, William L. Austin, Samuel M. Vauclain and Alba B. Johnson.

Charles L. Harris, who recently resigned the office of Manager of the lubricating department of the Waters-Pierce Oil Company to accept the office of the Third Vice-President and Sales Manager of the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., with office in St. Louis, was born in Boston and completed his education at the Massachusetts Institute of Technology. He began railway work in the office of the Chief Engineer of the Burlington & Missouri, now part of the Chicago, Burlington & Quincy, at Omaha, Neb. He was later Superintendent of the Land Department of the California Southern at San Diego, Cal.; then he was connected with the engineering department of the Atchison, Topeka & Santa Fe at Kansas City, Mo., and then with the traffic department of the same road at Topeka, Kan. Leaving railway service he went into the grain business at Omaha and at St. Joseph, Mo. In 1904 he engaged in the railway supply business at St. Louis, becoming Southwestern Agent of the Carbon Steel Co., Pittsburgh, Pa.; the Latrobe Steel Co., Latrobe, Pa., and the A. French Spring Co., Pittsburgh, Pa. Since that time he has been an active factor in the railway supply trade of St. Louis and the southwest.



Charles L. Harris.

TRADE PUBLICATIONS.

Steel Cars.—The Joliet Steel Mfg. Co., Joliet, Ill., has issued a booklet in which it gives a description of the Campbell-Olden steel side-dump car illustrated by a drawing showing the construction and mechanism of the car.

Denver & Rio Grande.—The company is distributing an attractive little booklet entitled "Among the Rockies." It is a complete guide to the principal attraction in the Rocky mountains as seen from the train on the lines of the system.

Export Trade Directory.—The National Business League of America, Chicago, has published "Practical Suggestions for Development of the American Export Trade." It includes directories of the chief cities of Brazil, Chili, Panama and southeast Africa, furnished by consular officers in these countries.

Cold Drawn Seamless Steel Locomotive Flues.—The Detroit Seamless Steel Tube Co., Detroit, Mich., is distributing a pamphlet quoting the experience with cold-drawn seamless steel locomotive flues of B. F. Sarver, of the Pennsylvania Lines, submitted to the International Master Boiler Makers' Association at the convention in Louisville, Ky., last April.

Chicago & North Western.—The company has issued a folder on the summer resorts in the Lake Superior country. Descriptions and brief facts are given in regard to points of interest, including information on railway fares, a list of the principal hotels and a map of the Lake Superior country.

Chicago, Burlington & Quincy.—A handsome 72-page book on "Scenic Colorado" contains a map of Colorado showing every geographical point and every topographical feature, with a reference index thereto. The company has also issued a pamphlet with schedule of through trains from Chicago to Seattle, and another with schedule of through trains to Denver. Another folder describes tours to Yellowstone Park, with fares and a map of the park.

Gasolene Locomotives.—Publication No. 100 of the Milwaukee Locomotive Manufacturing Co., Milwaukee, Wis., describes gasolene-driven locomotives. The design and construction of the engines is covered in detail, with illustrations, and there is interesting data on capacities, fuel consumption, tractive effort, etc., tables being given of the sizes and capacities of the various types of locomotives. There are a number of illustrations from photographs of these locomotives in different kinds of service.

Track and Railway Supplies.—General catalogue No. 30 of the Kalamazoo Railway Supply Co., Kalamazoo, Mich., maker of track and railway supplies, is being distributed. It is a 272-page book, 4½ x 7, with flexible leather cover. The large line of products of the company is fully illustrated and described, and a complete index facilitates quick reference to the various devices. There are 16 pages of useful information in the back and a number of blank pages for memoranda. W. K. Kenly Co., Chicago, is Western Representative for the concern.

FOREIGN RAILWAY NOTES.

In building a railway in China recently native engineers thought to overcome the necessity of sinking a pier far below water by the simple method of building an island and founding the pier on that, and were very much astonished to find island, pier and all fall victims to the first flood.

Mr. Almagia, an Italian contractor in Alexandria, Egypt, has asked the Ottoman and Egyptian governments to allow him to make plans for a railway line by way of El Arish to Jaffa. The idea is that the line, after crossing the Suez canal, should run along the coast to the frontier at El Arish and then on to its terminus at Jaffa, where it would connect with the Jerusalem railway.

Press reports from St. Louis, Mo., say that W. S. Dawley, C.E., has signed an agreement with the Chinese government at \$25,000 a year to build a railway in China, 400 miles long. Chen Tong and Wu Tze Yum represented the Chinese government in the negotiations. The proposed railway will traverse the province of Yunnan. The initial survey will be made by Mr. Dawley, who will have the title of chief engineer to the Chinese government in the province of Yunnan and also entire charge of the construction work. The project is financed entirely by Chinese private capital, backed by a substantial appropriation from the government, which will have control of its affairs.

The Trans-Baikal News states that the annual receipts of the Trans-Baikal railways for the year 1908 were \$4,892,500 and the expenditure about \$12,875,000, leaving a deficit of about \$7,982,500. As a result of the reduction of railway freight rates on beans, the export of this article from Manchuria via Vladivostok is growing. At the end of March two steamers were loading beans at Vladivostok and more were expected from Japan to get similar cargoes. Between February 11 and 20, 1,033 carloads of foodstuffs were transported over the Chinese Eastern railway to Vladivostok from Pogranetchnaia, Manchuria, of which there were 943 carloads of wheat, 18 of flour and 72 of bean cakes. On February 20 the following carloads (one carload weighs 12 tons) were at the port ready for shipment: Beans, 2,072; bean cakes, 191; bran, 21; kolan (Chinese grain), 51; oats, 18; maize, 1; assorted, 24.